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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

UNITED STATES OF AMERICA, *ex rel.* JAHR, *et al.*, Plaintiffs, v. TETRA TECH EC, INC., *et al.*, Defendants.	Case No. C 13-3835 JD **UNITED STATES' COMPLAINT IN INTERVENTION AGAINST TETRA TECH EC, INC.** **DEMAND FOR JURY TRIAL**

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For its Complaint in Intervention against Tetra Tech EC, Inc., the United States of America alleges as follows:

I. NATURE OF ACTION

1. The United States brings this action against Tetra Tech EC, Inc. ("Tetra Tech EC") to recover treble damages and civil penalties under the False Claims Act, 31 U.S.C. §§ 3729-33, and to recover damages and other monetary relief under the common law theory of breach of contract.

2. This action concerns Tetra Tech EC's submission of false claims under contracts with the United States Navy to provide radiological remediation services at the Hunters Point Naval Shipyard ("Hunters Point") in San Francisco, California.

3. Hunters Point was established as a commercial shipyard in 1870. The Navy operated the shipyard from 1940 to 1974 and, during that time, it used Hunters Point to house the Naval Radiological Defense Laboratory and to decontaminate ships. In 1989, Hunters Point was declared a Superfund site under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), requiring a long-term cleanup plan. In 1991, the Base Realignment and Closure Commission (BRAC) recommended Hunters Point for closure. The Navy has agreed to convey Hunters Point to the City and County of San Francisco for residential and commercial development on a parcel-by-parcel basis as the environmental cleanup is completed.

4. From 2003 through 2014, Tetra Tech EC and certain of its predecessor companies (collectively, "Tetra Tech") entered into a series of contracts with the United States Navy to provide radiological remediation services at Hunters Point. These contracts required Tetra Tech,

among other things, to investigate radiological contamination of soil and buildings, remediate and remove waste as necessary, and provide status reports to the Navy documenting its activities to support the redevelopment of radiologically impacted sites and buildings at Hunters Point for non-military use. The objective of these contracts was to achieve "free-release" of radiologically impacted areas by testing soil and buildings in those areas, and remediating as necessary, until test results demonstrated that radiation levels were below applicable release criteria and regulatory limits. Pursuant to its agreement with the City and County of San Francisco, the Navy must complete the radiological remediation of Hunters Point before it can transfer the property to the City and County for redevelopment. The Navy awarded contracts to Tetra Tech to perform these services at certain areas of Hunters Point designated as Parcels B, C, D-2, E and G, and Utility Corridors 1, 2, and 3.[1] The following map depicts the Parcels of Hunters Point, including those where Tetra Tech was to perform radiological remediation:

[1] The Navy awarded contracts to other contractors to perform testing and remediation in the other parcels of Hunters Point.

5. As detailed below, Tetra Tech violated the False Claims Act and breached its contracts with the Navy by: (1) misrepresenting the source of soil samples submitted to the laboratory for testing; (2) manipulating data from radiological testing of buildings; and (3) reporting false results from the radiological soil and building tests. Tetra Tech submitted false claims to the Navy for this work as if it was properly performed when it was not. The Navy relied on Tetra Tech's misrepresentations in concluding that the remediation of radiologically-

impacted areas at Hunters Point was complete and made payments to Tetra Tech based on these material misrepresentations.

6. During the period May 2005 through January 2018, Tetra Tech submitted, or caused to be submitted, materially false claims to the Navy for fraudulent testing and reporting at Hunters Point, and made, or caused to be made, material false statements to the Navy in connection with the fraudulent testing and reporting. In addition, Tetra Tech breached contracts with the Navy, causing disruption, uncertainty, and delays in the remediation and transfer of parcels of land at Hunters Point. Tetra Tech's conduct caused the United States to incur substantial additional costs, the magnitude of which is still increasing.

II. JURISDICTION AND VENUE

7. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331, 1345, 1367(a), and 31 U.S.C. § 3732. The Court may exercise personal jurisdiction over Tetra Tech pursuant to 31 U.S.C. § 3732(a) because Tetra Tech transacts business in this District.

8. Venue is proper in the Northern District of California under 31 U.S.C. § 3732(a) and 28 U.S.C. § 1391(b) and (c) because Tetra Tech transacts business in this District.

III. PARTIES

9. The United States brings this action on behalf of the Department of the Navy.

10. Tetra Tech EC, Inc. is a wholly-owned subsidiary of Tetra Tech Inc., with its principal place of business in Morris Plains, New Jersey. At all times relevant to this complaint, Tetra Tech EC, Inc., and its predecessor companies, was a company providing remediation and construction services worldwide, including to the federal government. Tetra Tech's predecessor

companies include Foster Wheeler Environmental Corporation and Tetra Tech FW Inc. Upon information and belief, Tetra Tech EC assumed all liabilities of its predecessor companies.

IV. THE FALSE CLAIMS ACT

11. The False Claims Act, 31 U.S.C. §§ 3729-33, as amended by the Fraud Enforcement and Recovery Act of 2009, Pub.L. 111-21 (May 20, 2009), provides, in pertinent part, that:

> [A]ny person who—
>
> (A) knowingly presents, or causes to be presented, a false or fraudulent claim for payment or approval; [or]
>
> (B) knowingly makes, uses, or causes to be made or used, a false record or statement material to a false or fraudulent claim;
>
> is liable to the United States Government for a civil penalty of not less than $5,000 and not more than $10,000, as adjusted by the Federal Civil Penalties Inflation Adjustment Act of 1990 (28 U.S.C. § 2461 note; Public Law 104-410), plus 3 times the amount of damages which the Government sustains because of the act of that person.

31 U.S.C. § 3729(a)(1).

12. Prior to the enactment of the Fraud Enforcement and Recovery Act of 2009, the False Claims Act provided, in pertinent part, that:

> Any person who –
>
> (1) knowingly presents, or causes to be presented, to an officer or employee of the United States Government or a member of the Armed Forces of the United States a false or fraudulent claim for payment or approval;
>
> (2) knowingly makes, uses, or causes to be made or used, a false record or statement to get a false or fraudulent claim paid or approved by the Government;
>
> Is liable to the United States Government for a civil penalty of not less than $5,000 and not more than $10,000, plus 3 times the amount of damages which the Government sustains because of the act of that person[.]

13. Pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990, as amended by the Debt Collection Improvement Act of 1996, 28 U.S.C. § 2461, and 64 Fed. Reg. 47099, 47103 (1999), the False Claims Act civil penalties were adjusted to $5,500 to $11,000 per false claim for violations occurring on or after September 29, 1999. The penalty range was increased to $10,781 to $21,563 effective August 1, 2016, for violations occurring on or after November 2, 2015. 81 Fed. Reg 42491, 42494 (2016).

14. The False Claims Act defines "knowing" and "knowingly" as follows:

[T]he terms "knowing" and "knowingly"—

(A) mean that a person, with respect to information—

(i) has actual knowledge of the information;

(ii) acts in deliberate ignorance of the truth or falsity of the information; or

(iii) acts in reckless disregard of the truth or falsity of the information; and

(B) require no proof of specific intent to defraud.

31 U.S.C. § 3729(b)(1).

V. FACTUAL ALLEGATIONS

A. Radiological History of Hunters Point

15. Hunters Point is located in southeast San Francisco on a peninsula that extends east into the San Francisco Bay. A subsidiary of the Bethlehem Steel Company operated it as a drydock facility for commercial and military ship maintenance and repair from 1868 until 1939, when the Navy purchased it. On December 18, 1941, eleven days after the United States entered World War II, the Navy took full control of Hunters Point. To support the war effort, the Navy constructed numerous buildings, and excavated surrounding hills to expand the shoreline into the

Bay. After World War II ended, the Navy used Hunters Point's expansive berthing facilities for reserve fleet ships returning from the Pacific.

16. Shipyard operations by the Navy involved the use of general radioactive material. Such operations included refurbishment and handling of radioluminescent devices and paint, gamma radiography, calibration laboratory operations to ensure the accuracy of radiological survey instruments, and decontamination of ships (including ships returning from Operation Crossroads -- atomic weapons testing in the Bikini Atoll in the Marshall Islands). In addition, in 1946, the Navy established at Hunters Point a laboratory that eventually became the Naval Radiological Defense Laboratory ("Defense Lab"). The Defense Lab, which occupied up to 20 buildings at Hunters Point, was a center for research into decontamination and the effects of fallout and radiation on living organisms and on natural and synthetic materials. The Defense Lab used a large number of radionuclides, as well as machines that generated radiation and charged particles. The Navy closed the Defense Lab in 1969. The Navy also used Hunters Point's berthing and drydocking facilities for the maintenance and repair of nuclear-powered ships.

17. The Navy ceased operating Hunters Point as a Naval shipyard in 1974. From 1974 to 1986, the Navy leased facilities at Hunters Point to private tenants. The Navy resumed operation of the shipyard in 1986, when Hunters Point was designated as an annex to Naval Station Treasure Island. Shipyard operations were permanently terminated on December 29, 1989. In 1991, Hunters Point was identified for closure and reuse pursuant to the Base Realignment and Closure Act of 1988. On January 21, 1994, the Navy and the City and County of San Francisco

executed a memorandum of understanding establishing a process for the transfer of Hunters Point to the City and County of San Francisco for redevelopment.

18. In 1989, the United States Environmental Protection Agency (EPA) placed Hunters Point on the National Priorities List of Superfund sites pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), which required the Navy to conduct a preliminary assessment of contamination of the property.[2] Accordingly, the Navy conducted and published a two-volume Historical Radiological Assessment (HRA). Volume II, entitled *Final Historical Radiological Assessment, History of the Use of General Radioactive Materials, 1939 – 2003,* was published in August 2004. It concluded that low levels of radioactive contamination existed within Hunters Point, and identified impacted sites for further investigation and remediation.

19. On April 21, 2006, the Navy published the *Final Basewide Radiological Removal Action Memorandum-Revision 2006, Hunters Point Shipyard, San Francisco, California* ("2006 Action Memo"). The purpose of the 2006 Action Memo was to document for the administrative record the Navy's "decision to undertake time-critical removal actions (TCRAs), at areas throughout the base that may contain localized radioactive contamination in soils, debris/slag, and buildings [at Hunters Point], as identified in [the HRA]." Attached as Table 1 to the 2006 Action Memo were the "release criteria." The release criteria established the cleanup goals for each radionuclide of concern for soil, surfaces, and water. The 2006 Action Memo prescribed that "[b]efore initiating a removal action per this [Action Memo], the area being considered will be characterized using real-time radiation detection devices or soil sampling and analysis."

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[2] Parcel A of Hunters Point was removed from the National Priorities List in February 1999, and transferred to the City and County of San Francisco in December 2004.

20. Several radiological investigations and radiological removal actions have been conducted at Hunters Point since being placed on the National Priorities List. As discussed below, the Navy awarded several contracts to Tetra Tech, to perform these investigations and removal actions.

B. Contracts Awarded to Tetra Tech for Radiological Remediation at Hunters Point

21. In order to conduct the necessary radiological investigation and remediation at Hunters Point, the Navy solicited proposals from contractors pursuant to several Environmental Multiple Award Contracts for Environmental Remediation Services for Radiological Contaminants. As discussed below, the Navy awarded several contracts (called "task orders") to Tetra Tech for the radiological investigation and remediation of radiologically-impacted sites throughout Hunters Point.

22. The objective of the task orders was to achieve "free release" of the radiologically-impacted areas at Hunters Point so that the Navy could transfer the property to the City and County of San Francisco for redevelopment. The HRA defines "free release" as a recommendation made after investigations and surveys indicate all applicable release criteria have been met and the site is ready for review by Navy and regulatory agencies for future non-radiological use. The release criteria for each radionuclide of concern for surfaces, soil and water, is set forth in Table 1 to the 2006 Action Memo and incorporated by reference into each of the relevant task orders.

23. The task orders required the radiological investigation and remediation to be accomplished through testing and analysis of soil samples, and the scanning of building surfaces with radiological detection instruments. Soil samples and radiological readings of building

surfaces were conducted within designated "survey units," which are measured areas throughout Hunters Point. Task orders awarded to Tetra Tech included both cost plus award fee contracts and firm fixed price contracts.

(1) Cost Plus Award Fee Contracts

24. The cost plus award fee contracts awarded to Tetra Tech obligated the Navy to pay Tetra Tech its allowable costs for providing the services described in the scope of work, plus a discretionary award fee, up to a maximum amount. Cost plus award fee contracts allow the payment of an award fee, based on a judgmental evaluation by the government, sufficient to provide motivation for excellence in contract performance. *See* Federal Acquisition Regulation (FAR) § 16.305. A contractor may earn an award fee if its overall cost, schedule, and technical performance is satisfactory. FAR § 16.401. For each of the cost plus award fee contracts identified below, Tetra Tech submitted progress reports and vouchers for its costs and fees. A government official certified the vouchers for payment in reliance on Tetra Tech's representations.

25. On March 23, 2003, the Navy awarded contract number N68711-98-D-5713, task order 0072 ("Task Order 5713-0072"), to Foster Wheeler Environmental Corporation, a predecessor company of Tetra Tech EC, Inc. The Navy's purpose in awarding Task Order 5713-0072 was to acquire radiological sampling and remediation services for Hunters Point. Services required under Task Order 5713-0072 included radiological surveys and remedial activities of buildings, former building sites, sewer and drain systems, fill, and surrounding areas in Parcels C, D, and E of Hunters Point. Task Order 5713-0072 was a cost plus award fee contract that obligated the Navy to pay Tetra Tech its allowable costs for providing the required services, plus

a discretionary award fee, not to exceed the maximum cost plus fee of $31,397,209. After 52 contract modifications, the total contract value awarded was $83,721,008.

26. On February 13, 2004, the Navy awarded contract number N68711-98-D-5713, task order 0084 ("Task Order 5713-0084"), to Tetra Tech FW Inc., a predecessor company of Tetra Tech EC, Inc. The objective of Task Order 5713-0084 was to excavate and dispose of anthropogenic polychlorinated biphenyl ("PCB") soil contamination from a PCB Excavation Site in Parcel E of Hunters Point. Because low-level radiation was expected to be present in the soil, radiation screening of the soil was also required. Task Order 5713-0084 was a cost plus award fee contract that obligated the Navy to pay Tetra Tech its allowable costs for providing the required services, plus a discretionary award fee, not to exceed the maximum cost plus fee of $1,368,238. After 27 contract modifications, the total contract value awarded was $10,248,848.

27. On March 28, 2006, the Navy awarded contract number N62473-06-D-2201, task order 006 ("Task Order 2201-006") to Tetra Tech EC, Inc. The scope of work in Task Order 2201-006 required Tetra Tech to perform radiological investigation and remediation to address radiologically-impacted sites in Parcel B and one building in Parcel D. The primary objective of Task Order 2201-006 was for Tetra Tech EC, Inc. to complete all radiological work for each radiologically-impacted site in Parcel B that was identified in the HRA, and to provide general base-wide radiological support services. Task Order 2201-006 was a cost plus award fee contract that obligated the Navy to pay Tetra Tech its allowable costs for providing the services, plus a discretionary award fee, not to exceed the maximum cost plus fee of $17,485,300. Task Order 2201-006 included an option to increase the costs by $2,351,058 and the fee by $213,728. After 13 contract modifications, the total contract value awarded was $32,742,848.

28. On December 18, 2006, the Navy awarded contract number N44255-01-D-2000, task order 0070 ("Task Order 2000-0070"), to Tetra Tech EC, Inc. The primary objective of Task Order 2000-0070 was for Tetra Tech EC, Inc. to complete all radiological work for each radiologically-impacted site in Parcel D that was identified in the HRA, and some unfinished work in Parcel B. The task order required Tetra Tech to perform surveys and remediation of buildings, a pier, and sanitary sewer and storm drain sites. Task Order 2000-0070 was a cost plus award fee task order. The task order obligated the Navy to pay Tetra Tech its allowable costs for providing the services, plus a discretionary award fee, not to exceed the maximum cost plus fee of $14,990,147. After eight contract modifications, the total contract value awarded was $22,523,715.

29. On April 20, 2009, the Navy awarded contract number N62473-07-D-3211, task order 0018 ("Task Order 3211-0018"), to Tetra Tech EC, Inc. The objective of Task Order 3211-0018 was for Tetra Tech to provide base-wide support to contractors performing chemical and radiological removal and remediation at Hunters Point. Tetra Tech was required to maintain on-site laboratory services to test survey samples for radionuclides of concern, and to operate a Radiological Screening Yard to support radiological removal actions and investigations being performed under different task orders. Task Order 3211-0018 was a cost plus award fee contract that obligated the Navy to pay Tetra Tech its allowable costs for providing the services, plus a discretionary award fee, not to exceed the maximum cost plus fee of $13,882,869. After 12 contract modifications, the total contract value awarded was $19,126,849.

30. On June 3, 2009, the Navy awarded contract number N62473-07-D-3211, task order 0019 ("Task Order 3211-0019"), to Tetra Tech EC, Inc. The primary objective of Task Order

3211-19 was for Tetra Tech to complete specified radiological remediation and surveys at remaining Parcel B sanitary sewer and storm drain sites. Task Order 3211-0019 was a cost plus award fee contract that obligated the Navy to pay Tetra Tech its allowable costs for providing the services, plus a discretionary award fee, not to exceed the maximum cost plus fee of $884,716. After five contract modifications, the total contract value awarded was $876,764.

(2) Fixed Price Contract Awards

31. The firm fixed price contracts awarded to Tetra Tech obligated the Navy to pay a maximum fixed amount for the services required under the contracts, regardless of Tetra Tech's costs. Firm fixed price contracts place upon the contractor maximum risk and full responsibility for all costs and resulting profit or loss. *See* FAR § 16.202-1. Firm fixed price contracts provide maximum incentive for the contractor to control costs and perform effectively, and impose a minimum administrative burden on the contracting parties. *Id*. For each of the firm fixed price contracts awarded to Tetra Tech identified below, Tetra Tech submitted monthly progress reports and invoices based on the percentage of work completed. Tetra Tech certified the invoices for payment, and government officials authorized payment to Tetra Tech in reliance on Tetra Tech's representations.

32. On September 4, 2008, the Navy awarded contract number N62473-08-D-8823, task order 002 ("Task Order 8823-002"), to Tetra Tech EC, Inc. The primary objective of Task Order 8823-002 was to remove and remediate sewer and storm drain lines along Fisher and Spear Avenues. Task Order 8823-002 required Tetra Tech to remove, survey, remediate, clear, and dispose of appropriately all sewer and storm drain systems, including the peripheral soil, in these two areas in order to attain free release. Task Order 8823-002 was a firm fixed price task order

that obligated the Navy to pay Tetra Tech a maximum fixed amount of $6,343,703 for providing the services required under the contract, regardless of Tetra Tech's costs. After six contract modifications, the total contract value awarded was $7,033,848.

33. On September 21, 2009, the Navy awarded contract number N62473-08-D-8823, task order 003 ("Task Order 8823-003"), to Tetra Tech EC, Inc. Task Order 8823-003 addressed the recommendations in the HRA for the radiologically-impacted sites in Parcel E, specifically focusing on sanitary sewer and storm drain lines along Crisp Road, and radiologically-impacted buildings and sites in the central portion of Parcel E. The primary objective of the solicitation was to achieve unrestricted free release of the sewer and storm line survey units along Crisp Road and the central areas of Parcel E. Additional work required by Task Order 8823-003 included surveys, remediation, and reporting for certain radiological buildings and sites in Parcel E. Task Order 8823-003 was a firm fixed price contract that obligated the Navy to pay Tetra Tech a maximum fixed amount of $13,070,672 for providing the services required under the contract, regardless of Tetra Tech's costs. After five contract modifications, the total contract value awarded was $13,019,641.

34. On June 23, 2010, the Navy awarded contract number N62473-10-D-0809, task order 002 ("Task Order 0809-002"), to Defendant Tetra Tech EC, Inc. The focus of Task Order 0809-002 was Parcel C. The primary objective of the scope of work in Task Order 0809-002 was to achieve free release of Buildings 203, 214, 241, 271, and 272, and unrestricted free release of the sewer and storm drain survey units in Parcel C. Task Order 0809-002 was a firm fixed price contract that obligated the Navy to pay Tetra Tech a maximum fixed amount of $11,494,845 for

providing the services required under the contract, regardless of Tetra Tech's costs. After nine contract modifications, the total contract value awarded was $12,082,759.

35. On September 9, 2010, the Navy awarded contract number N62473-10-D-0809, task order 0004 ("Task Order 0809-0004"), to Defendant Tetra Tech EC, Inc. Task Order 0809-0004 obligated Tetra Tech to provide base-wide radiological support to enable contractors to complete radiological removal and remediation work at Hunters Point, including the operation of radiological screening yards that accepted and processed radiologically impacted soil from the removal of storm and sanitary sewers, and the performance of routine surveys of radiologically impacted buildings and sites. Task Order 0809-0004 was a firm fixed price contract. The contract obligated the Navy to pay Tetra Tech a maximum fixed amount of $14,040,521 for the services required under the contract, regardless of Tetra Tech's costs. After 10 contract modifications, the total contract value awarded was $24,843,771.

36. On September 22, 2010, the Navy awarded contract number N62473-10-D-0809, task order 007 ("Task Order 0809-007"), to Tetra Tech EC, Inc. The solicitation for Task Order 0809-007 was for radiological remediation and support for the 500 series area of Parcel E. The objective was to achieve free release of sewer and storm drain survey units, buildings, building sites, and the 500 series site of Parcel E. Task Order 0809-007 was a firm fixed price contract that obligated the Navy to pay Tetra Tech a maximum fixed amount of $9,984,979 for providing the services required under the contract, regardless of Tetra Tech's costs. After 11 contract modifications, the total contract value awarded was $11,408,410.

37. On July 10, 2012, the Navy awarded contract number N62473-10-D-0809, task order 0012 ("Task Order 0809-0012"), to Tetra Tech EC, Inc. Task Order 0809-0012 was in support of Phase II of Parcel C remediation, focusing on sanitary sewer and storm drain lines and radiologically-impacted ship berths and sites. The objective of the solicitation was to achieve unrestricted free release of the sewer and storm drain survey units and ship berths in Parcel C. For the ship berths, Tetra Tech was required to perform characterization surveys, remediation, remedial action surveys, and final status surveys, and submit a final status survey report. For the sanitary and sewer drain systems, Tetra Tech was responsible for removing the sewer and storm drain lines and the associated impacted soil, surveying the trench and remediating it as necessary, performing a final status survey, and submitting a final status survey report to the Navy. Task Order 0809-0012 was a firm fixed price contract that obligated the Navy to pay Tetra Tech a maximum fixed amount of $9,846,298 for providing the services required under the contract, regardless of Tetra Tech's costs. After five contract modifications, the total contract value awarded was $10,487,802.

38. On September 19, 2012, the Navy awarded contract number N62473-12-D-2006, task order 0004 ("Task Order 2006-0004"), to Tetra Tech EC, Inc. Task Order 2006-0004 required Tetra Tech to perform and report on surveys to analyze the radiological contamination in Buildings 253 and 211 in Parcel C and to identify and bound the areas of contamination. Task Order 2006-0004 was a firm fixed price contract that obligated the Navy to pay Tetra Tech a maximum fixed amount of $5,892,247 for the services required under the contract, regardless of Tetra Tech's costs. After two contract modifications, the total contract value awarded was $7,255,881.

39. On August 13, 2013, the Navy awarded contract number N62473-10-D-0809, task order 0015 ("Task Order 0809-0015"), to Tetra Tech EC, Inc. Task Order 0809-0015 addressed recommendations in the HRA for radiologically-impacted sanitary sewer and storm drain lines in Parcel E. Tetra Tech was responsible for the excavation of the sanitary sewer and storm drain lines, as well as the sampling, analysis, and clearance of radiologically-impacted soils. The primary objective of Task Order 0809-0015 was to complete the removal action, and deliver a Final Status Survey Report containing adequate information and data to achieve unrestricted free release. Task Order 0809-0015 was a firm fixed price contract that obligated the Navy to pay Tetra Tech a maximum fixed amount of $4,894,307 for the services required under the contract, regardless of Tetra Tech's costs. After two contract modifications, the total contract value awarded was $5,061,910.

40. On September 23, 2014, the Navy awarded contract number N62473-10-D-0809, task order 0016 ("Task Order 0809-0016"), to Tetra Tech EC, Inc. Task Order 0809-0016 was in support of Phase III of Radiological Remediation and Support of Parcel C. The objective of Task Order 0809-0016 was to achieve unrestricted free release of the remaining sewer and storm drain survey units in Parcel C, and unrestricted free release of Buildings 205 and 224. Task Order 0809-0016 was a firm fixed price contract that, as modified, obligated the Navy to pay Tetra Tech a maximum fixed amount of $669,812 for the services required under the contract, regardless of Tetra Tech's costs.

41. The contracts identified in paragraphs 24-40 shall be referred to collectively as the "Relevant Contracts."

C. Governing Contract Terms, Regulations, and Procedures to Ensure Proper Radiological Investigation of Soil and Buildings

42. Each of the Relevant Contracts required Tetra Tech to conduct radiological investigation of soil and buildings in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). MARSSIM is a consensus document published by the EPA, the U.S. Department of Defense, the U.S. Department of Energy, and the U.S. Nuclear Regulatory Commission that provides detailed guidance for the investigation and remediation of radiologically impacted sites.

43. For the radiological investigation and remediation of soil at Hunters Point, the Relevant Contracts and MARSSIM required Tetra Tech to take the following steps for each survey unit: (1) determine the boundaries of the survey unit; (2) collect soil samples for laboratory analysis in order to characterize the survey unit; (3) if laboratory results demonstrate that the soil is above release criteria, remediate survey unit by removing and disposing of soil; (4) collect soil samples for laboratory analysis from locations that tested above release criteria to ensure that remediation was effective; (5) further remediate if necessary; and (6) collect final status survey soil samples for laboratory analysis. The Relevant Contracts require Tetra Tech to "perform remediation and additional excavation until remediation goals have been met and or appropriate risk levels have been reached."

44. The Relevant Contracts required Tetra Tech to provide radiological investigation of buildings at Hunters Point by conducting alpha, beta, and gamma radiation scans of building surfaces using radiation detection instruments. The Relevant Contracts and MARSSIM required Tetra Tech to take the following steps: (1) scan and remove material, equipment, and building debris; (2) determine the Class, and therefore size, of survey units (Class 1 survey units, defined

as having reasonable potential for contamination above release criteria, are divided into areas of less than 100 square meters; Class 2 survey units, defined as having reasonable potential for contamination but below release criteria, are divided into areas less than 1,000 square meters); (3) conduct radiation scans by moving detectors across surfaces at required speeds; (4) download data from detection instruments; (5) correct survey results for naturally occurring background radiation; (6) evaluate data to determine whether the survey unit exceeds release criteria; (7) remediate, remove and dispose of material, if necessary; and (8) repeat the above steps until release criteria are met.

D. Tetra Tech's Fraudulent Course of Conduct

45. At all times relevant to this Complaint, Tetra Tech contracted with New World Technology, Inc. or Radiological Survey & Remedial Services, Inc. to provide Radiological Control Technicians (RCT) to work on the radiological investigation and remediation of Hunters Point. Tetra Tech managers, including Stephen Rolfe and Justin Hubbard, supervised crews of RCTs who were collecting soil samples and conducting building scans in Parcels B, C, D-2, E and G, and Utility Corridors 1, 2, and 3.

46. William Dougherty was the Project Manager for Tetra Tech between on or about March 1, 2006 and early 2014. Dougherty worked on-site at Hunters Point, and was responsible for managing all aspects of Tetra Tech's work. Dougherty had daily contact with, and gave direction to, Rolfe and Hubbard.

47. At all times relevant to the complaint, Dennis McWade was a Construction Manager for Tetra Tech at Hunters Point. McWade worked on-site at Hunters Point, and was responsible

for managing the crews performing radiological surveys and remediation at Hunters Point for Tetra Tech. McWade had daily contact with, and gave direction to, Rolfe and Hubbard.

48. At all times relevant to the complaint, Rick Weingarz was employed by Tetra Tech as an Assistant Project Manager at Hunters Point. Weingarz worked on-site at Hunters Point, and was responsible for managing the crews performing radiological surveys and remediation at Hunters Point for Tetra Tech. Weingarz had daily contact with, and gave direction to, Rolfe and Hubbard.

49. Andrew Bolt, who has been Tetra Tech's President since on or about July 2014, served as Tetra Tech's Senior Vice President, Remediation and Program Manager, from 1994 until 2014. Bolt, who was Dougherty's boss, provided Dougherty with monthly financial reports regarding Tetra Tech's profits from its contracts to perform remediation work at Hunters Point.

50. Rolfe, Hubbard, Dougherty, McWade, Weingarz and Bolt were each employed by Tetra Tech EC in a managerial capacity at all times relevant to this Complaint, and each of them was acting within the scope of employment at all times relevant to this Complaint.

51. Tetra Tech's fraud was initiated and directed by Tetra Tech's corporate managers, including, but not limited to, Bolt, Dougherty, Weingarz, McWade, Rolfe, and Hubbard.

(1) **When Investigating Soil Contamination, Tetra Tech Caused Technicians to Replace Collected Soil Samples with Clean Soil From a Different Location Before Submitting the Samples to the Lab for Analysis**

52. In performing the Relevant Contracts, Tetra Tech was responsible for conducting soil surveys, in accordance with MARSSIM, in order to identify and define the boundaries of

radiological contamination. Soil surveys were used to determine whether further remediation was necessary.

53. As part of the soil survey process, each parcel was divided into a number of "survey units," each of which defined a discrete area for analysis. Where feasible and practical, survey units were defined with reference to fixed features within a parcel, such as a building, or a trench created from the removal of a sewer or storm drain line. For areas other than buildings, Tetra Tech was responsible for collecting soil samples from designated points within each survey unit and submitting the samples to a laboratory for analysis. If the laboratory analysis demonstrated a higher-than-allowable concentration of radionuclides of concern within a particular survey unit, Tetra Tech was required to remediate the survey unit. After completing the work it believed was necessary to remediate the area, Tetra Tech would collect new samples (or building scan data) for another round of analysis. This process was repeated until all samples collected within a survey unit passed laboratory analysis, at which time the survey unit was deemed to have met the release criteria.

54. As detailed below, Tetra Tech managers instructed RCTs to discard soil samples collected from certain Survey Units at Hunters Point, replace the discarded samples with "clean" soil from other locations, and submit the replaced samples to the lab for analysis. Through this process, Tetra Tech misrepresented the location from which soil samples were collected and, thus, misrepresented the character of soil in the survey units from which it purported to have collected the samples.

55. In the course of conducting soil surveys under the Relevant Contracts, Tetra Tech managers, including Stephen Rolfe and Justin Hubbard, ordered RCTs to collect soil in buckets

from a location where they knew the soil was "clean," *i.e.,* below the release criteria for radionuclides of concern. Rolfe and Hubbard instructed the RCTs to keep the buckets of "clean" soil in a CONEX box (a trailer-sized container used to transport and store supplies) on site. After RCTs collected soil samples in Ziploc bags, Rolfe and Hubbard ordered the RCTs to bring the bagged samples to the CONEX box, where they were instructed to empty the bags, and fill new bags with the "clean" soil from the buckets. Tetra Tech personnel labeled the new bags with the Survey Unit and Sample Identification Numbers of the discarded samples, and submitted the switched soil samples to the onsite lab for analysis. Tetra Tech submitted these falsified soil samples to the lab accompanied by a Tetra Tech Chain-of-Custody Record falsely identifying the Survey Unit (and therefore the location from which the soil was collected) of each sample. Each Chain-of-Custody Record was signed by the RCT or Tetra Tech representative relinquishing the samples, as well as the lab employee receiving the samples.

56. On the cost plus award fee contracts, Tetra Tech benefited from the falsification of soil surveys by billing for work it failed to perform in accordance with the Relevant Contracts, and by receiving award fees to which it was not entitled. On firm fixed price contracts, Tetra Tech benefited from the falsification of soil surveys by avoiding its obligation to remediate contaminated areas, thus decreasing its overall costs. Tetra Tech management at Hunters Point, including Project Manager Dougherty, was praised in performance evaluations for performing task orders under cost.

57. Tetra Tech falsified or caused the falsification of soil surveys, as described above, in connection with its work in the survey units identified in Exhibit 1 hereto. As a result, the

reports Tetra Tech submitted to the Navy in connection with this work (which are identified in Exhibit 1 and described in paragraphs 66-68 below) were false.

(2) Rolfe and Hubbard Plead Guilty to Charges of Destruction, Alteration, or Falsification of Records in Federal Investigations

58. On March 15, 2017, Tetra Tech manager Stephen Rolfe pleaded guilty to destruction, alteration, or falsification of records in federal investigations and bankruptcy, in violation of 18 U.S.C. § 1519. In pleading guilty, Rolfe admitted that on approximately 20 occasions in 2012 he instructed the RCTs on his team to get "clean dirt" from areas known to be clean and taken from outside the marked Survey Unit areas to use as substitute samples for the dirt from the Survey Unit, and that he did this so that the Survey Unit would pass the laboratory analysis and not require further remediation. He further admitted that the switching of soil samples was done inside the CONEX box on site at Hunters Point and in his presence. He also admitted that, on these occasions, he knew that the soil locations reported on the Chain-of-Custody Record forms were false. Rolfe admitted that the motivation for his conduct came from pressure applied from his Tetra Tech management at Hunters Point, including Dougherty, Weingarz and McWade. Rolfe admitted that Tetra Tech management at Hunters Point directed him to get his crew "the hell out" of a survey unit that was testing above the release criteria, told him that they were "not remediating the whole goddam site," and directed him on numerous occasions to "get clean dirt."

59. On May 18, 2017, Tetra Tech manager Justin Hubbard pleaded guilty to destruction, alteration, or falsification of records in federal investigations and bankruptcy, in violation of 18 U.S.C. § 1519. In pleading guilty, Hubbard admitted that in 2012 he obtained "clean" dirt from an area north of Buildings 253 and 211 at Hunters Point and substituted it for dirt taken from at least four Survey Units in the North Pier area of Hunters Point (i.e., Survey Units 1, 8, 10, and

11). He further admitted that he filled a five-gallon bucket with "clean" serpentinite soil from an area outside the relevant Survey Unit, and brought the bucket back to the CONEX box. Hubbard admitted that, once inside the CONEX box, he emptied the "legitimate" soil samples previously collected by RCTs from their sampling bags into an empty bucket, and substituted the clean serpentinite soil into each sampling bag. He also admitted that by switching the soil, he knew that the data on the Chain-of-Custody Record forms was false. Rolfe further admitted that he knew that the false data on the Chain-of-Custody Record forms was incorporated into maps and reports submitted to the Navy for the purpose of demonstrating that the area had been successfully remediated.

60. In engaging in the conduct described above, Rolfe and Hubbard acted within the scope of their employment with Tetra Tech, and for the purpose of benefitting Tetra Tech. Tetra Tech Management at Hunters Point, including but not limited to Dougherty, McWade, and Weingarz also acted within the scope of their employment with Tetra Tech, and for the purpose of benefitting Tetra Tech, when they knowingly directed and encouraged, and were aware of, the falsification of soil samples. Tetra Tech management did not alert the Navy of the fraud.

(3) When Investigating Building Contamination, Tetra Tech Falsified Data Collected from Radiation Detection Instruments

61. In performing the Relevant Contracts, Tetra Tech was responsible for conducting surveys of existing buildings, in accordance with MARSSIM, in order to characterize areas of radiological contamination. Building surveys were used to determine whether further remediation was necessary.

62. Tetra Tech conducted radiological building surveys by using radiation detection instruments to scan surfaces in the buildings. The radiation detection instruments were either

handheld or mounted on a cart. The data collected by the radiation detection instruments was downloaded by Tetra Tech personnel into a database, and then imported into a spreadsheet that was delivered to the Navy. The Navy relied on the results of Tetra Tech's building surveys to determine whether further remediation was necessary.

63. Following the discovery of the falsification of soil samples, the Navy reviewed the data from radiological surveys performed by Tetra Tech in buildings at Hunters Point. The Navy found that strings of data from readings from one instrument and surface were repeated for readings from other instruments and surfaces within a building. Duplicated strings of data were discovered in the results of surveys conducted in 15 of 28 buildings. In some instances, the exact time, to the second, that the reading was taken was also duplicated. In other cases, duplicated data strings were altered slightly in an effort to conceal manipulation of the data. The probability that the duplicated strings of data that the Navy discovered could occur by chance or innocent error is extraordinarily low.

64. Tetra Tech manipulated and falsified the building scan data that it provided to the Navy, rather than providing actual radiation detection results from a full building survey.

65. Tetra Tech falsified data collected from radiological scans of buildings throughout Hunters Point, including but not limited to Buildings 103, 113, 113A, 130, 146, 253, 272, 351, 351A, 365, 366, 401, 411, 439, and 810. Tetra Tech's falsification of data was sufficiently widespread that the Navy has been required to obtain new surveys of each of these buildings.

E. Final Status Survey Reports, Survey Unit Project Reports, and Removal Action Completion Reports

66. Pursuant to the Relevant Contracts, Tetra Tech prepared and submitted to the Navy Final Status Survey Reports, Final Survey Unit Project Reports, final Removal Action

Completion Reports, and/or Characterization Survey Result Reports (collectively, the "Reports") upon completion of the investigation and remediation of a survey unit. The Reports described the procedures and the results of the surveys performed to achieve unrestricted radiological release of the radiologically-impacted sites at Hunters Point. The Reports were signed by Dougherty as Tetra Tech's Project Manager at Hunters Point, in addition to other Tetra Tech officials.

67. In the Reports, Tetra Tech falsely stated that soil samples were properly collected from designated survey units, when, in fact, samples of soil that Tetra Tech management knew to be "clean" were collected from locations outside of the designated survey units and submitted to the laboratory for analysis. In the Reports, Tetra Tech stated the soil sample analytical results as if the soil was properly collected.

68. In the Reports, Tetra Tech falsely stated that building surveys were completed and properly performed, when in fact the building scan data was manipulated. In the Reports, Tetra Tech stated the building survey results as if the buildings were properly scanned and the data were properly recorded and reported.

F. Tetra Tech's Submission of False Claims

69. Tetra Tech submitted claims for payment to the United States under each of the Relevant Contracts knowing that the claims were false or fraudulent because they included claims: (a) for soil surveys in which Tetra Tech misrepresented the source of the soil samples collected; (b) for building surveys in which Tetra Tech falsified the data collected by radiation detection instruments; and/or (c) for preparing status survey reports containing falsified results from soil and building surveys.

70. Tetra Tech management, including but not limited to Dougherty and Bolt, submitted or caused to be submitted vouchers and invoices, accompanied by progress reports, representing that it fully and properly investigated and remediated radiological contamination in soil and buildings at Hunters Point. As described above, these representations were false.

71. Tetra Tech "knowingly" submitted vouchers and invoices and accompanying progress reports containing material misrepresentations, within the meaning of the False Claims Act, 31 U.S.C. § 3729(b).

G. Tetra Tech's Fraud Has Caused Disruption, Uncertainty, and Delays

72. Tetra Tech's fraudulent course of conduct has caused substantial disruption, uncertainty, and delay in the plan to remediate and transfer Hunters Point to the City and County of San Francisco for redevelopment, as well as fear in the community regarding the effects of any continued contamination at the site. Because of Tetra Tech's fraud in investigating the radiological contamination, the Navy will have pay another contractor to re-test much of the soil and buildings in the Parcels where Tetra Tech worked in order to determine whether further remediation is necessary. Tetra Tech's fraud has also caused the Navy to devote substantial resources to address the health and safety concerns of San Francisco residents. As a result of Tetra Tech's fraud, the transfer of Hunters Point to the City and County of San Francisco will be delayed by many years. The Government has also had to devote substantial resources to investigate the extent and impact of Tetra Tech's fraud.

FIRST CAUSE OF ACTION

(False Claims Act: Presentation of False Claims)

(31 U.S.C. § 3729(a)(1)(A))

73. The United States repeats and re-alleges the preceding paragraphs as if fully set forth herein.

74. Tetra Tech knowingly presented, or caused to be presented, false or fraudulent claims for payment or approval to the United States, in violation of 31 U.S.C. § 3729(a)(1)(A), by submitting claims for payment based upon falsified soil surveys, building surveys, and status survey reports. Tetra Tech's false or fraudulent claims include, but are not limited to, the invoices identified on Exhibit 2.

75. As a result of the false or fraudulent claims presented or caused to be presented by Tetra Tech, the United States paid Tetra Tech and suffered damages to be determined at trial. Under the False Claims Act, the United States is entitled to three times the amount of damages it sustained, plus civil penalties of not less than $5,500 and not more than $11,000 for each false claim.

SECOND CAUSE OF ACTION

(False Claims Act: False Statement Material to a False Claim)

(31 U.S.C. § 3729(a)(1)(B))

76. The United States repeats and re-alleges the preceding paragraphs as if fully set forth herein.

77. Tetra Tech made, used, or caused to be made or used, false records or statements material to false claims, in violation of 31 U.S.C. § 3729(a)(1)(B), by reporting false results from

soil and building surveys. Tetra Tech's false records or statements material to false claims include, but are not limited to those reports identified on Exhibit 1.

78. As a result of the false records or statements made or used, or cause to be made or used, by Tetra Tech, the United States paid Tetra Tech and suffered damages to be determined at trial. Under the False Claims Act, the United States is entitled to three times the amount of damages it sustained, plus civil penalties of not less than $5,500 and not more than $11,000 for each violation.

THIRD CAUSE OF ACTION

(Breach of Contract)

79. The United States repeats and re-alleges the preceding paragraphs as if fully set forth herein.

80. Each of the Relevant Contracts required Tetra Tech to perform soil and building surveys in accordance with MARSSIM and other contract specifications.

81. Based on the actions described above, Tetra Tech breached the Relevant Contracts by falsifying soil samples, falsifying building scan data, and failing to perform full, complete, and accurate investigations of radiological contamination.

82. The United States has incurred damages, including consequential damages, as a result of Tetra Tech's breaches of the Relevant Contracts.

PRAYER FOR RELIEF

WHEREFORE, the United States demands and prays that judgment be entered in its favor against Defendant Tetra Tech EC, Inc. as follows:

1. On the First Cause of Action under the False Claims Act, for the amount of the United States' damages, trebled as required by law, and such civil penalties as are required by law, together with such further relief as may be just and proper.

2. On the Second Cause of Action under the False Claims Act, for the amount of the United States' damages, trebled as required by law, and such civil penalties as are required by law, together with such further relief as may be just and proper.

3. On the Third Cause of Action for breach of contract, for an amount equivalent to the loss sustained by the United States, including consequential damages, plus interest, costs, and expenses, and for such further relief as may be just and proper.

DATED: January 14, 2019

Respectfully submitted,

ALEX G. TSE
United States Attorney

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DEMAND FOR JURY TRIAL

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, the United States demands a jury trial in this action.

DATED: January 14, 2019

Respectfully submitted,

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Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-10-D-0809
CTO NO. 0013

FINAL

NON-TIME-CRITICAL REMOVAL ACTION WORK PLAN FOR IR SITE 12 HOT SPOTS AND BUILDINGS 1121 AND 1323

April 2013

DCN: RMAC-0809-0013-0007

NON-TIME-CRITICAL REMOVAL ACTION FOR SOLID WASTE DISPOSAL AREA
RADIOLOGICAL HOT SPOT REMOVAL AND BUILDING DEMOLITION
INSTALLATION RESTORATION SITE 12
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

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NON-TIME-CRITICAL REMOVAL ACTION WORK PLAN FOR IR SITE 12 HOT SPOTS AND BUILDINGS 1121 AND 1323

April 2013

**NON-TIME-CRITICAL REMOVAL ACTION FOR SOLID WASTE DISPOSAL AREA
RADIOLOGICAL HOT SPOT REMOVAL AND BUILDING DEMOLITION
INSTALLATION RESTORATION SITE 12
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA**

DCN: RMAC-0809-0013-0007

Prepared by:

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Project Engineer

Approved by: ______________________
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Project Manager

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1.0 INTRODUCTION

The Department of the Navy (DON) contracted with Tetra Tech EC, Inc. (TtEC) to conduct a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Non-Time-Critical Removal Action (NTCRA) within the Westside Drive Solid Waste Disposal Area (SWDA) A & B at Installation Restoration (IR) Site 12 located at Naval Station Treasure Island (NAVSTA TI), San Francisco, California. This work will be executed under Contract No. N62473-10-D-0809, Contract Task Order (CTO) No. 0013. TtEC will perform the IR Site 12 NTCRA using their State of California Agreement State Radioactive Materials License No. 7909-01. The field activities to be performed under this CTO will be performed under the second phase of the NTCRA at IR Site 12 SWDA A & B.

The scope of this NTCRA will be to:

- Remove two hot spots identified in the California Department of Public Health (CDPH) Site 12 Gamma Survey Report (CDPH 2011).
- Perform a radiological survey and demolish Buildings 1121 and 1323.

To perform this work, the following plans will be used in conjunction with the site-specific information provided in this NTCRA Work Plan:

- **Health and Safety Plan**: Accident Prevention Plan/Site Safety and Health Plan, NAVSTA TI (TtEC 2012)
- **Task-specific Plan**: Task-specific Plan for the Buildings 1121 and 1323 Characterization Survey, NAVSTA TI (TtEC 2013a)
- **Buildings 1121 and 1323 Demolition Work Procedure**: Buildings 1121 and 1323 Demolition Work Procedure, NAVSTA TI (TtEC 2013b)

This NTCRA Work Plan provides site-specific information not included in the above-referenced plans or attachments listed below. The site-specific information addresses the following:

- Dust control and air monitoring requirements specific to the work locations
- Stormwater management requirements and Best Management Practices (BMPs) to be implemented during construction activities
- Traffic routes and measures for maintaining access for site tenants, residents, and other DON contractors during construction activities
- Data management requirements and procedures

The following five additional documents have been developed and are presented as attachments to this NTCRA Work Plan:

- Sampling and Analysis Plan (SAP) (Attachment 1)
- Project Contractor Quality Control (PCQC) Plan (Attachment 2)
- Radiation Protection Plan (Attachment 3)
- Radiological Management Plan (Attachment 4)
- Waste Management Plan (Attachment 5)

1.1 SITE CONDITIONS AND BACKGROUND

NAVSTA TI is located in San Francisco Bay, midway between San Francisco and Oakland, California (Figure 1-1). The former naval station consists of two contiguous islands: Treasure Island, which is approximately 403 acres, and Yerba Buena Island, which is approximately 147 acres. Treasure Island is a manmade island constructed of materials dredged from the bay. Military activities at the former NAVSTA TI date back to 1866, before the construction of Treasure Island, when the U.S. government took possession of Yerba Buena Island for defensive fortifications. In 1993, NAVSTA TI was designated for closure under the Base Closure and Realignment Act of 1990. The naval station was closed on September 30, 1997, and is currently in the transfer process.

IR Site 12 is located on the northwest portion of NAVSTA TI on a relatively flat 93-acre area (Figure 1-2). The site consists of multiplex housing units with private backyards and common area front yards, side yards, and surrounding greenbelts. The area was originally used as a parking lot during the 1939–1940 Golden Gate International Exposition. After Navy occupation of the island in 1940, the area was developed for bunker storage of munitions and other materials, vehicle equipment and storage, recreational playing fields, and disposal or burning of solid waste. Beginning in the1960s, areas of IR Site 12 were incrementally developed into housing for Navy personnel and their dependents. Former residential Buildings 1121 and 1323 are located within IR Site 12 near Westside Drive.

An NTCRA was implemented in May 2006 to remediate chemicals in soil associated with chemical/fuel storage and disposal or burning of solid waste in four SWDAs (SWDA A & B, SWDA 1231/1233, SWDA 1207/1209, and SWDA Bigelow Court) located within IR Site 12 (Figure 1-2). A Historical Radiological Assessment (HRA) (Weston 2006) identified the radiological contamination potential for the SWDAs as "unlikely" and recommended radiation monitoring during excavation of identified SWDAs. During the initial stages of this NTCRA, a radiation survey and sample analysis identified radium-226 (Ra-226)-impacted debris and soil in some of the SWDAs. Subsequently, an Action Memorandum (DON 2007) summarizing the site characteristics identified the chemicals of potential concern (COPCs) and the horizontal extent of the SWDAs. Generally, the radiological contamination in IR Site 12 SWDAs is colocated with chemical contaminants. The NTCRAs at IR Site 12 determined that some of the SWDAs were contaminated with radiological items or soil containing Ra-226. Elevated gamma readings were

also detected along the northern and southern fence lines (two areas) of SWDA A & B by the CDPH Radiologic Health Branch during a gamma survey conducted in April 2011. The current scope of work is to investigate and remediate these two areas with elevated gamma readings.

The Westside Drive SWDA, also known as SWDA A & B, is an approximately 4.5-acre area on the west side of IR Site 12 abutting Perimeter Road (Figure 1-2). Two radiological hot spots were identified near the Westside Drive SWDA along the northern and southern fence lines during the 2011 CDPH survey of this area. The source of radioactivity is believed to be near-surface radiological commodities containing Ra-226 (deck markers, foils containing radium powder, instrument gauges) but may include limited pockets of soil contamination. Based on CDPH's report, there is one area of elevated activity north of the currently established Radiologically Controlled Area (RCA) (Northern Hot Spot) and four locations of elevated activity south of the RCA (Southern Hot Spot) (Figure 1-2). This NTCRA focuses only on radiological contamination in the two radiological hot spots. The ongoing NTCRA activities in the center of SWDA A & B are currently being performed by another contractor under a separate contract.

1.2 REGULATORY FRAMEWORK

Environmental investigation and remediation activities at NAVSTA TI are being conducted under the Department of Defense IR Program in accordance with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Under Executive Order 12580, the DON is the lead agency responsible for implementation of the IR Program and any removal actions. The California Department of Toxic Substances Control is the lead regulatory agency. The CDPH and Regional Water Quality Control Board San Francisco Bay Region will provide additional state regulatory oversight.

1.3 REMOVAL ACTION OBJECTIVES

Based on past site history and results from ongoing NTCRAs, the DON has determined that chemical contamination present in soil and debris at the four SWDAs at IR Site 12 requires a response action. This decision was documented in the final Action Memorandum (AM) (DON 2007) and is consistent with the NCP requirements in Title 40 *Code of Federal Regulations* (CFR), Part 300.415(b)(2). The removal action objectives for remediation activities are to implement the AM Alternative 3 and protect public health and welfare and the environment by physically removing and disposing of contaminated soil and debris that exceed the criteria for the COPCs presented in Section 2.1.4 of the AM (DON 2007). This work is being performed by another contractor under a separate contract.

The removal action objectives for this NTCRA are to address radiological contamination in SWDA A & B, which includes 1) performing hot spot removal in two areas until the release criterion for Ra-226 is achieved and then performing an FSS for free release of these two hot spots; and 2) demolishing Buildings 1121 and 1323. Prior to demolition of the buildings,

radiological surveys of the interiors and exteriors will be performed to determine whether radiologically impacted soil has been tracked into the buildings or whether the wind has deposited radiologically impacted soil onto the exterior surfaces.

1.4 RELEASE CRITERIA

Residual levels of radioactive material that correspond to allowable radiation dose standards are derived by analysis of various pathways and scenarios such as direct exposure, inhalation, and ingestion. Release limits are presented in terms of activity concentration and usually refer to average levels of radiation or radioactivity above appropriate background levels. Based on existing data, only one radionuclide of concern was identified for this site, Ra-226, and the release criterion for this isotope is 1 picocurie per gram above background for soil. The release criteria for building surfaces are 20 disintegrations per minute (dpm)/100 square centimeters (cm^2) alpha or 200 dpm/100 cm^2 beta removable contamination, or 100 dpm/100 cm^2 alpha or 1,000 dpm/100 cm^2 beta fixed contamination.

1.5 AS LOW AS REASONABLY ACHIEVABLE

A basic concept in radiation protection specifies that exposure to ionizing radiation and releases of radioactive material should be managed to reduce collective dose to workers and the public and ensure that exposure is as low as reasonably achievable (ALARA). The ALARA principle will be considered during the course of the radiological work carried out under this NTCRA Work Plan.

1.6 DATA QUALITY OBJECTIVES

The data quality objectives (DQOs) specify project objectives, data collection boundaries and limitations, the most appropriate type of data to collect, and the level of acceptable decision error. In addition, the quality and quantity of data required to implement environmental removal actions are defined. The DQOs for the IR Site 12 NTCRA are identified and described in Worksheet #11 of the SAP (Attachment 1).

1.7 PROJECT POINTS OF CONTACT

Figure 1-3 presents the key individuals who are responsible for the oversight and/or implementation of the site activities. Section 2.0 of the PCQC Plan describes the organizational structure, functional responsibilities, levels of authority, and lines of communication within the organization to ensure high-quality work. A listing of the points of contact for the project is also provided in the PCQC Plan.

1.8 PROJECT SCHEDULE

Figure 1-4 presents the overall project schedule for completing the planning, hot spot removal, building survey and demolition, and reporting activities for this CTO.

1.9 WORK PLAN ORGANIZATION

This NTCRA Work Plan is organized as follows:

- **Section 1.0** provides the introduction, site conditions and background, regulatory framework, removal action objectives, release criteria, ALARA concept, DQOs, project points of contact, and report organization.
- **Section 2.0** describes the site work and field implementation for the hot spot removals and demolition of Buildings 1121 and 1323.
- **Section 3.0** describes stormwater management measures, site-specific requirements for dust control during implementation of the site work, and spill/release prevention, response, and reporting.
- **Section 4.0** provides traffic control measures to be implemented during construction activities.
- **Section 5.0** provides detail on the types of data to be collected over the course of the CTO and the procedures for the management of the data.
- **Section 6.0** presents details for project reporting.
- **Section 7.0** lists the references cited in the text.
- **Tables and figures** are included after the text.
- **Appendix A** provides the BMP Fact Sheets.
- **Appendix B** includes the responses to comments on the draft version of this NTCRA Work Plan.
- **Attachment 1** presents the SAP. This plan details laboratory operations that will support the survey activities. Included are procedures for swipe sample analysis, soil sample preparation, gamma spectroscopy analysis, and quality checks.
- **Attachment 2** presents the PCQC Plan. This plan establishes specific procedures and methods for field inspections, and provides an effective quality control system to ensure the quality of all work performed by TtEC and its subcontractor personnel during the implementation of the hot spot removal and building demolition.
- **Attachment 3** presents the Radiation Protection Plan. This plan identifies the day-to-day management of radiologically impacted sites, remediation, surveys, training requirements, health and safety concerns, and material handling requirements for this project.
- **Attachment 4** presents the Radiological Management Plan. This plan presents the survey and decontamination procedures and methodologies that will be implemented in support of radiological release of buildings, sites, structures, areas, materials and equipment, and personnel at NAVSTA TI.
- **Attachment 5** presents the Waste Management Plan. This plan presents the waste management practices and procedures to be followed, and identifies the types of waste expected to be generated.

LEGEND

STATE HIGHWAY

US HIGHWAY

INTERSTATE HIGHWAY

NAVAL STATION TREASURE ISLAND

WATER

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

NTCRA WORK PLAN
INSTALLATION RESTORATION SITE 12

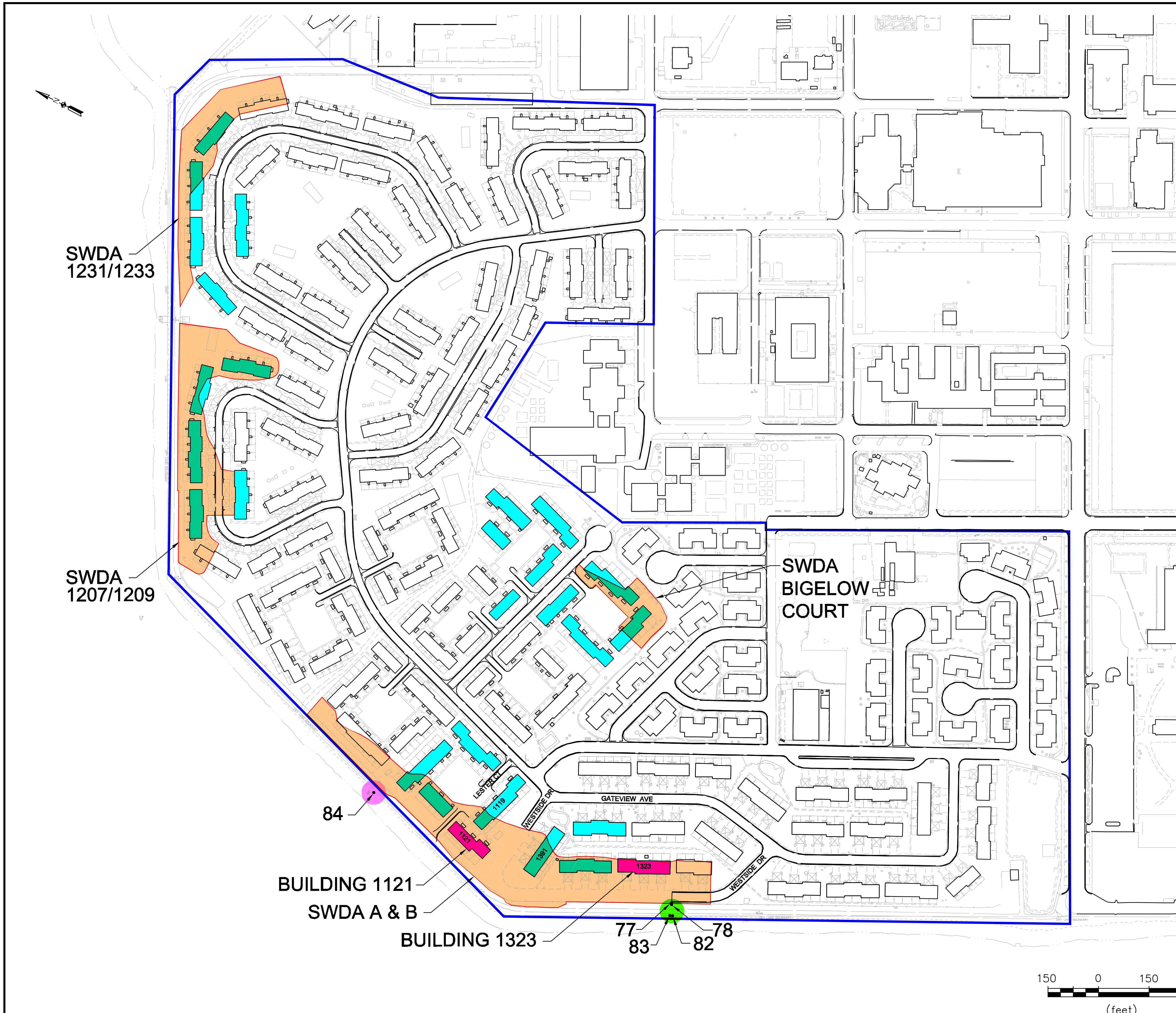
FIGURE 1-1

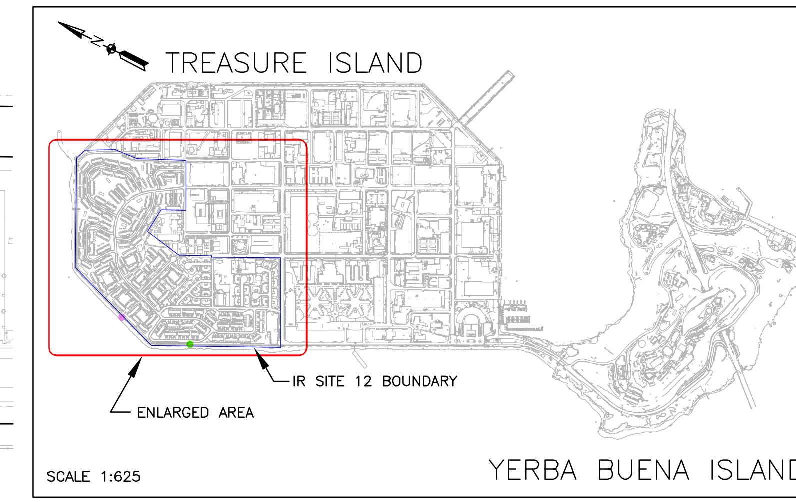
REGIONAL LOCATION MAP
NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVISION:
AUTHOR: DMACK
DCN:

TETRA TECH EC, INC.

P:\GIS\projects\Treasure Island\Fig1-1 Regional Location Map - Treasure Island (NTCRA).mxd





LEGEND:

IR SITE 12 BOUNDARY

SOLID WASTE DISPOSAL AREAS (SWDAs)

• 77 AREAS OF ELEVATED ACTIVITY

BUILDINGS TO BE DEMOLISHED

BUILDINGS

UNOCCUPIED BUILDINGS

NORTHERN HOT SPOT (INCLUDES SAMPLE ID 84)

SOUTHERN HOT SPOT (INCLUDES SAMPLE IDS 77, 78, 82, AND 83)

CDPH Elevated Activity Data

Sample ID	Longitude	Latitude	Exposure Rate one meter (µR/hr)	Exposure Rate contact (µR/hr)	Dose Rate one meter (µrem/hr)	Dose Rate contact (µrem/hr)	Gamma Count Rate contact (cpm)
77	-122.3780747	37.82557866	8	800	4	500	349224
78	-122.3780826	37.82557246	8	11	4	13	53735
82	-122.3781783	37.825522	6.5	90	4	80	155981
83	-122.3781904	37.82554082	6	28	5	10	24428
84	-122.378509	37.8281435	12.5	600	5	450	880097

Source: CDPH 2011

NOTE:
AREAS OF ELEVATED ACTIVITY (77, 78, 82, 83, AND 84) BASED ON CALIFORNIA DEPARTMENT OF PUBLIC HEALTH SURVEY PERFORMED IN APRIL 2011 (TREASURE ISLAND, SITE 12 GAMMA SURVEY REPORT, SURVEY DATES: APRIL 5–7, 2011 DATED SEPTEMBER 23, 2011).

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

NTCRA WORK PLAN
INSTALLATION RESTORATION SITE 12

FIGURE 1-2

SITE LOCATION MAP
NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CA

REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

TETRA TECH EC, INC.

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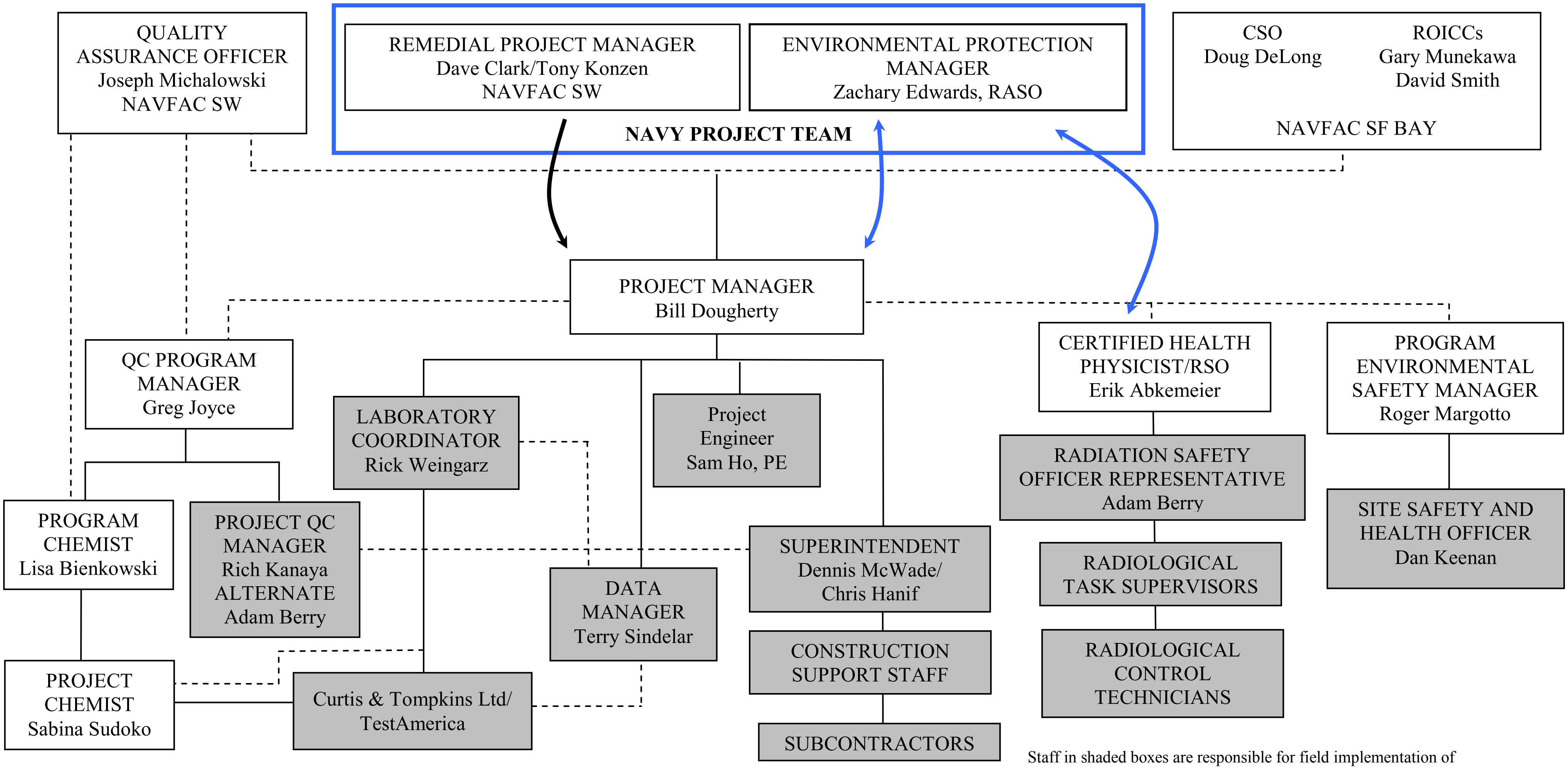
9/27/12

FIGURE 1-3

PROJECT ORGANIZATION CHART



Legend

Formal reporting relationship

Supporting relationship

Primary lines of technical communication

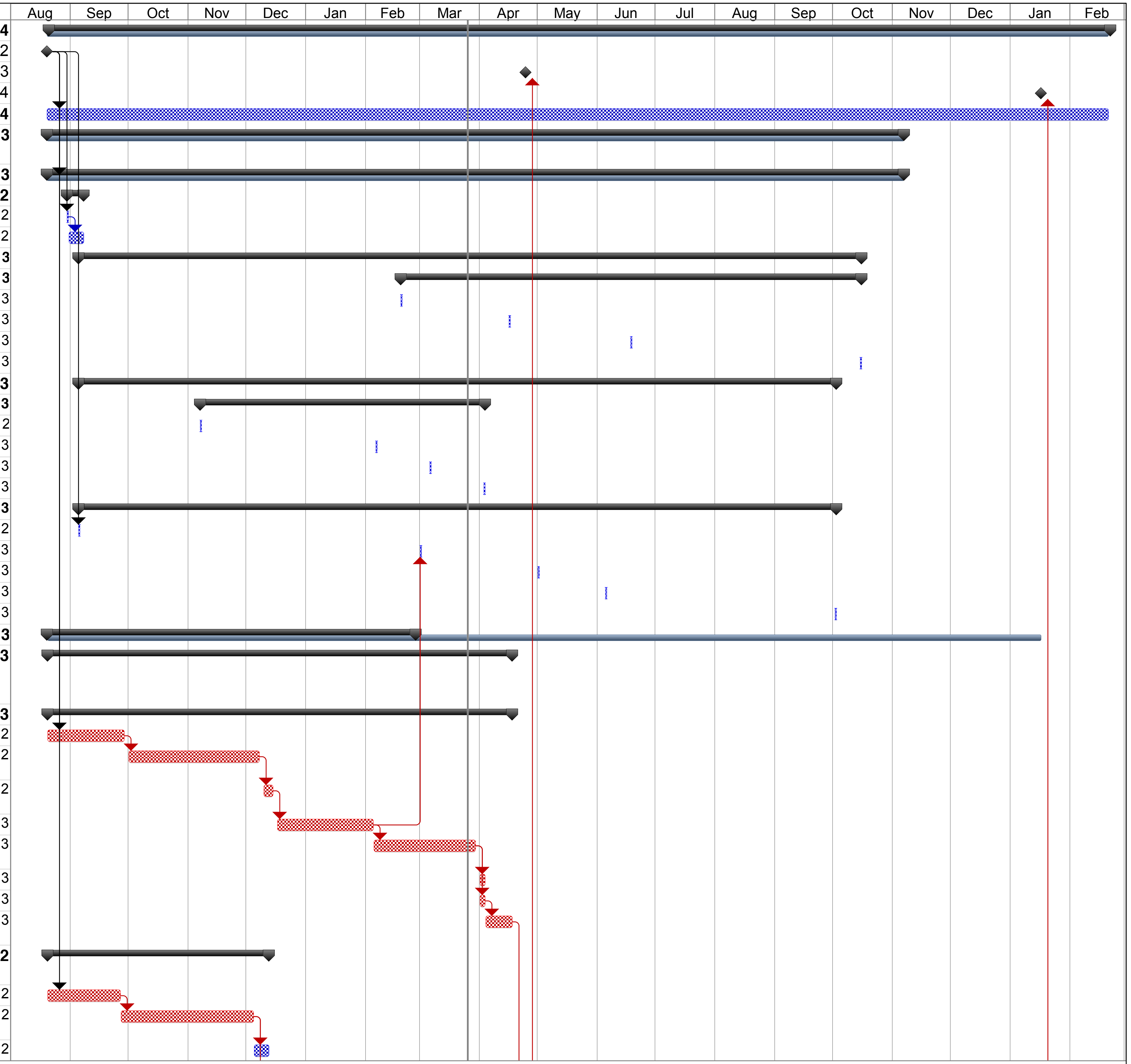
Line of technical direction (alternate where dashed)

Staff in shaded boxes are responsible for field implementation of activities under the NTCRA Work Plan.

The Construction Manager (Jeff Bray) has overall responsibility for coordinating the activities of on-site technical staff.

Abbreviations and Acronyms:
CSO – Contractor Site Office
NAVFAC SW – Naval Facilities Engineering Command Southwest
NTCRA – Non-Time-Critical Removal Action
RASO – Radiological Affairs Support Office
ROICC – Resident Officer in Charge of Construction
RSO – Radiation Safety Officer
QC – quality control
SF – San Francisco

ID	Task Name	Duration	Start	Finish
1	**GENERAL**	**386 days**	**Tue 8/21/12**	**Fri 2/21/14**
2	Contract Award	0 days	Mon 8/20/12	Mon 8/20/12
3	Field Work Notice to Proceed	0 days	Wed 4/24/13	Wed 4/24/13
4	Project Complete	0 days	Thu 1/16/14	Thu 1/16/14
5	**Project Management/Administrative Support**	**550 edays**	**Mon 8/20/12**	**Fri 2/21/14**
6	**PTO X002 NTCRA for SWDA - Radiological Hot Spot Removal and Building Demolition IR 12**	**311 days**	**Mon 8/20/12**	**Wed 11/6/13**
7	**Project Meetings**	**311 days**	**Mon 8/20/12**	**Wed 11/6/13**
8	**Kick off meeting**	**6 days**	**Thu 8/30/12**	**Fri 9/7/12**
9	Attend Meeting (Meeting date TBD by the RPM)	1 day	Thu 8/30/12	Thu 8/30/12
10	Meeting minutes (within 10 days of meeting)	5 days	Fri 8/31/12	Fri 9/7/12
11	**Community Relations and Regulatory Interaction**	**284 days**	**Wed 9/5/12**	**Tue 10/15/13**
12	**RAB Meetings (3rd Tues pm, Every other Month)**	**168 days**	**Tue 2/19/13**	**Tue 10/15/13**
13	RAB Meeting 1 - Present Draft Work Plan and RTCs	1 day	Tue 2/19/13	Tue 2/19/13
14	RAB Meeting 2 - Update on field activities	1 day	Tue 4/16/13	Tue 4/16/13
15	RAB Meeting 3 - Update on field activities	1 day	Tue 6/18/13	Tue 6/18/13
16	RAB Meeting 4 - Present Draft RACR and RTCs	1 day	Tue 10/15/13	Tue 10/15/13
17	**BCT Meetings (1st Wed every month)**	**275 days**	**Wed 9/5/12**	**Wed 10/2/13**
18	**BCT Monthly Meetings**	**103 days**	**Wed 11/7/12**	**Wed 4/3/13**
19	BCT Monthly Meeting 1 (San Francisco)	1 day	Wed 11/7/12	Wed 11/7/12
20	BCT Monthly Meeting 2 (San Francisco)	1 day	Wed 2/6/13	Wed 2/6/13
21	BCT Monthly Meeting 3 (San Francisco)	1 day	Wed 3/6/13	Wed 3/6/13
22	BCT Monthly Meeting 4 (San Francisco)	1 day	Wed 4/3/13	Wed 4/3/13
23	**BCT Technical Meetings**	**275 days**	**Wed 9/5/12**	**Wed 10/2/13**
24	BCT Technical Meeting 1 - Work Plan Scoping	1 day	Wed 9/5/12	Wed 9/5/12
25	BCT Technical Meeting 2 - Work Plan RTC Meeting	1 day	Fri 3/1/13	Fri 3/1/13
26	BCT Technical Meeting 3 - TBD by Navy	1 day	Wed 5/1/13	Wed 5/1/13
27	BCT Technical Meeting 4 - TBD by Navy	1 day	Wed 6/5/13	Wed 6/5/13
28	BCT Technical Meeting 5 - RACR RTC Meeting	1 day	Wed 10/2/13	Wed 10/2/13
29	**Prepare NTCRA Work Plan and Supporting Documents**	**133 days**	**Mon 8/20/12**	**Tue 2/26/13**
30	**Work Plan w/SAP, RPP, EPP (DMP and SWMP), CQCP, Demolition Work Procedure, RMP, Project Management, WMP, Traffic Plan, Data Management Plan**	**169 days**	**Mon 8/20/12**	**Wed 4/17/13**
31	**Work Plan**	**169 days**	**Mon 8/20/12**	**Wed 4/17/13**
32	Prepare Internal Draft Work Plan	29 days	Mon 8/20/12	Fri 9/28/12
33	Navy Review of Internal draft Work Plan (60 days per SMP for RASO Review)	49 days	Mon 10/1/12	Fri 12/7/12
34	Prepare Draft Work Plan (7 days after Navy comments per SMP)	5 days	Mon 12/10/12	Fri 12/14/12
35	Regulator Review of Draft Work Plan (30 days per SMP)	34 days	Mon 12/17/12	Mon 2/4/13
36	Develop/Submit Internal Final Work Plan and RTCs/Participate in Working Meeting w Navy/Agencies (33 days per SMP)	39 days	Tue 2/5/13	Fri 3/29/13
37	Navy Review of Internal Final Work Plan (14 days per SMP)	3 days	Mon 4/1/13	Wed 4/3/13
38	Develop/Submit Final Work Plan to Agencies (14 days per SMP)	3 days	Mon 4/1/13	Wed 4/3/13
39	Agency Review of Final Work Plan (14 days per SMP; Plan finalized if no comments received within 14 days per SMP)	10 days	Thu 4/4/13	Wed 4/17/13
40	**Site Safety and Health / Accident Prevention Plan (SSHP/APP)**	**81 days**	**Mon 8/20/12**	**Wed 12/12/12**
41	Prepare Internal Draft SSHP/APP	27 days	Mon 8/20/12	Wed 9/26/12
42	NMPHC / RPM / NAVFAC SW Safety Office Review Draft SSHP/APP	48 days	Thu 9/27/12	Tue 12/4/12
43	Prepare Final SSHP/APP Plan	6 days	Wed 12/5/12	Wed 12/12/12

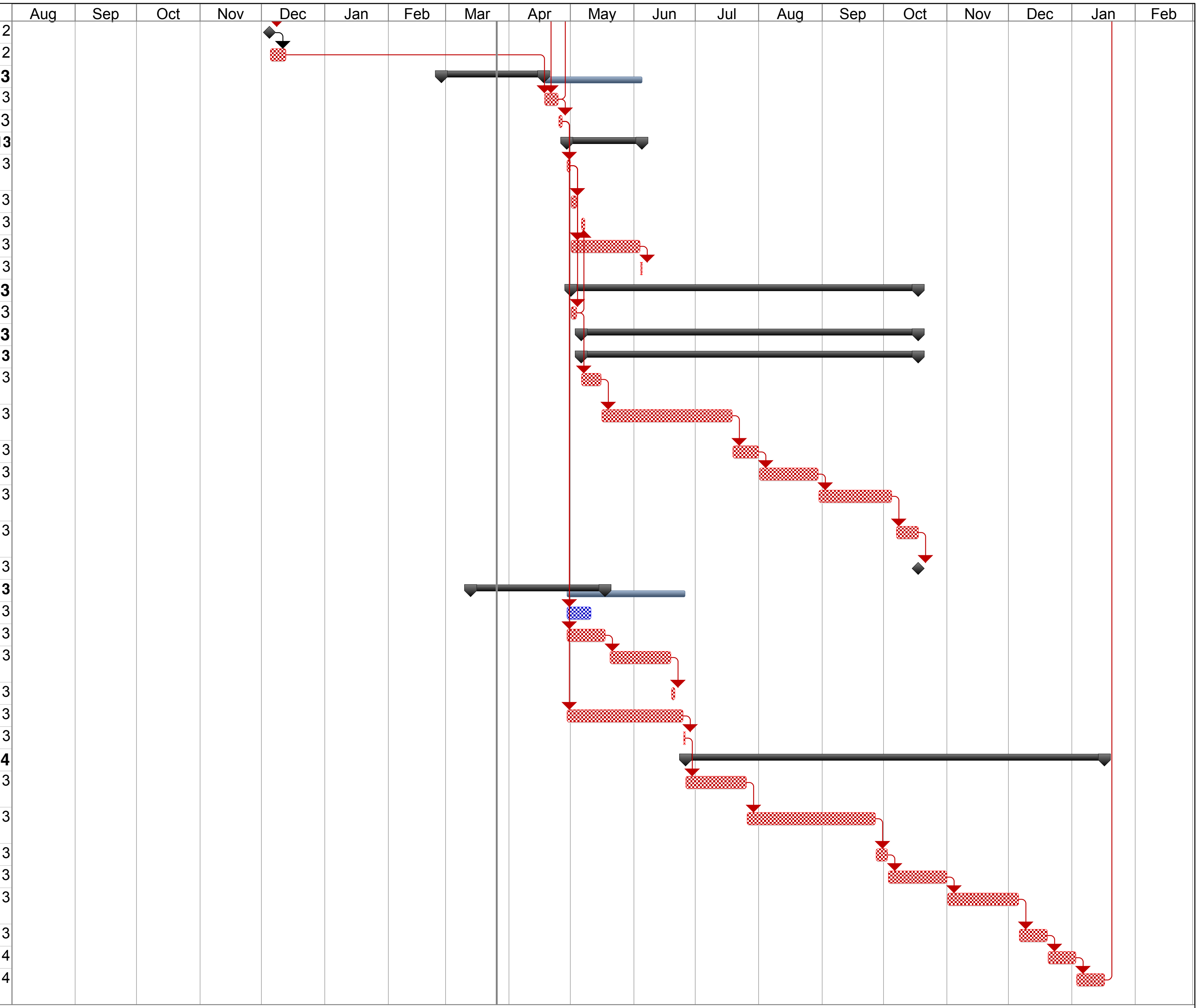


Project: CTO 0013 Draft NAVSTA TI I
Date: Tue 3/26/13

Task	Rolled Up Task	Inactive Task	Manual Task	Start-only
Critical Task	Rolled Up Critical Task	Inactive Task	Duration-only	Finish-only
Milestone	Rolled Up Progress	Inactive Milestone	Manual Summary Rollup	Progress
Summary	Group By Summary	Inactive Summary	Manual Summary	

Figure 1-4 Project Schedule
NTCRA Work Plan
Naval Station Treasure Island, San Francisco, CA

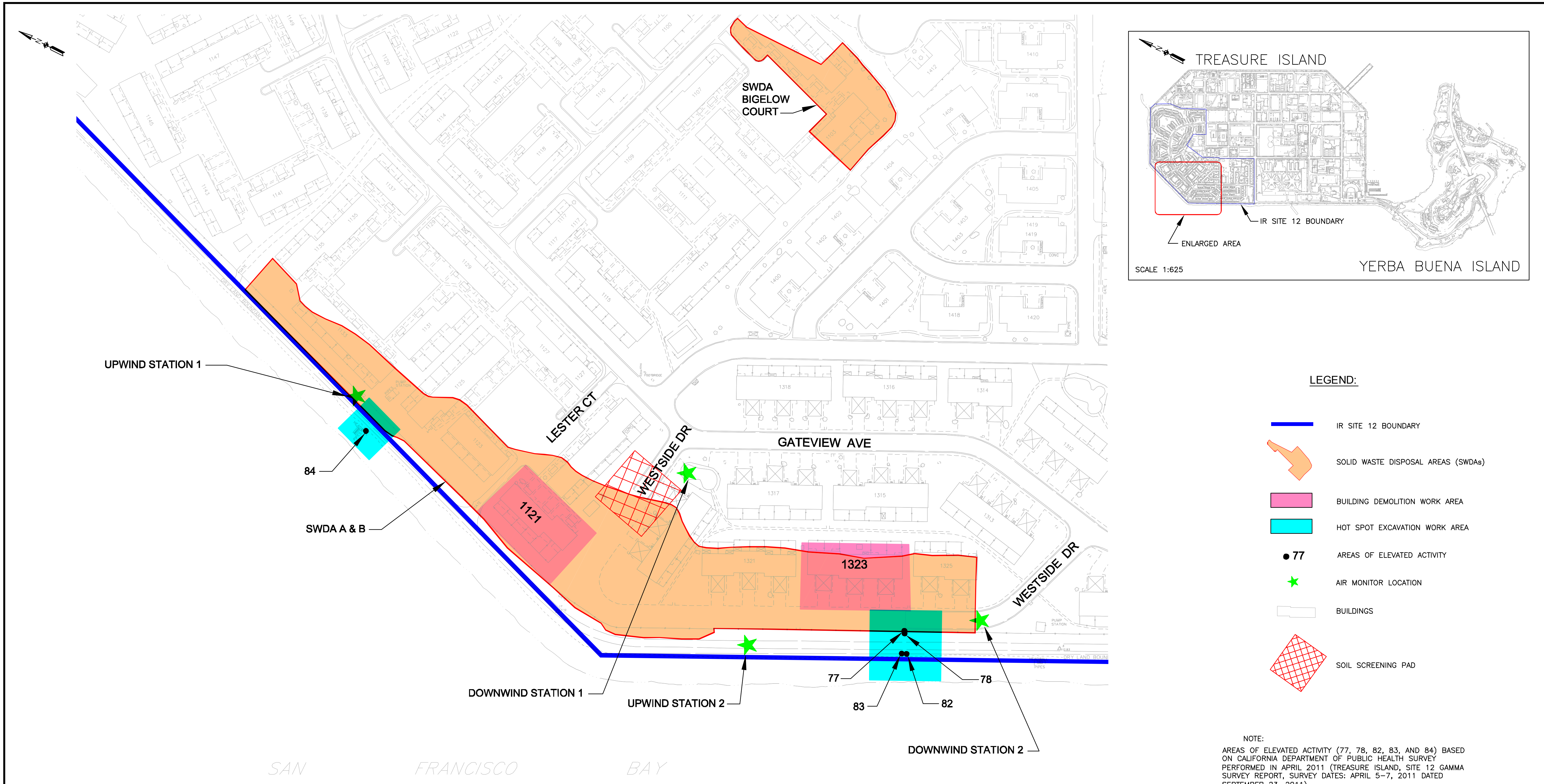
ID	Task Name	Duration	Start	Finish
44	Submit RTC's for Navy Review/Approval	0 days	Tue 12/4/12	Tue 12/4/12
45	Issue Final SSHP/APP Plan	6 days	Wed 12/5/12	Wed 12/12/12
46	**Field Work "Implement the NTCRA Work Plan"**	**36 days**	**Wed 2/27/13**	**Wed 4/17/13**
47	**Receive Notice to Proceed**	5 days	Thu 4/18/13	Wed 4/24/13
48	**Mobilization**	2 days	Thu 4/25/13	Fri 4/26/13
49	**Site Work - Removal Activities**	**26 days**	**Mon 4/29/13**	**Tue 6/4/13**
50	Radiological Soil Screening / Excavation of Hot Spots / Remediate / Spread Material on Pad	2 days	Mon 4/29/13	Tue 4/30/13
51	Scan / Sample Pad Material / Remediate	3 days	Wed 5/1/13	Fri 5/3/13
52	Backfill Excavations / Site Restoration	2 days	Mon 5/6/13	Tue 5/7/13
53	Waste Characterization and Disposal	23 days	Wed 5/1/13	Mon 6/3/13
54	Scan Ground Surface after Pad Removal	1 day	Tue 6/4/13	Tue 6/4/13
55	**Implement Final Status Survey at Westside Drive Hotspots**	**119 days**	**Wed 5/1/13**	**Thu 10/17/13**
56	Survey / Sample Excavated Hot Spots	3 days	Wed 5/1/13	Fri 5/3/13
57	**Final Status Survey Report**	**116 days**	**Mon 5/6/13**	**Thu 10/17/13**
58	**FSS Report for Hot Spots**	**116 days**	**Mon 5/6/13**	**Thu 10/17/13**
59	Prepare Internal Draft FSS (no later than 60 days after FSS confirmation results received)	8 days	Mon 5/6/13	Wed 5/15/13
60	Navy Review of Internal Draft FSS (60 day RASO Review per SMP)	44 days	Thu 5/16/13	Thu 7/18/13
61	Prepare Draft FSS (14 days after Navy comments)	9 days	Fri 7/19/13	Wed 7/31/13
62	Agency Review of Draft FSS (30 days per SMP)	21 days	Thu 8/1/13	Thu 8/29/13
63	Develop Final FSS and RTCs/Participate in Working Meeting w Navy/Agencies (33 days per SMP)	25 days	Fri 8/30/13	Fri 10/4/13
64	Final FSS (14 days after Regulatory/Public Concurrence on RTCs)	9 days	Mon 10/7/13	Thu 10/17/13
65	Issue Final FSS	0 days	Thu 10/17/13	Thu 10/17/13
66	**Demolition of Buildings 1121 and 1323**	**48 days**	**Wed 3/13/13**	**Fri 5/17/13**
67	Asbestos and Lead Abatement	10 days	Mon 4/29/13	Fri 5/10/13
68	M&E / Building Surveys	15 days	Mon 4/29/13	Fri 5/17/13
69	Navy and CDPH Review of Survey Data / CDPH Perform Confirmatory Survey	21 days	Mon 5/20/13	Tue 6/18/13
70	Building Demolition	2 days	Wed 6/19/13	Thu 6/20/13
71	Waste Management and Disposal	40 days	Mon 4/29/13	Mon 6/24/13
72	Demobilization	1 day	Tue 6/25/13	Tue 6/25/13
73	**Removal Action Completion Reports (RACR)**	**144 days**	**Wed 6/26/13**	**Thu 1/16/14**
74	Prepare Internal Draft RACR (no later than 60 days after building demolition/debris disposed)	21 days	Wed 6/26/13	Thu 7/25/13
75	Navy Review of Internal draft RACR (60 day RASO Review per SMP)	44 days	Fri 7/26/13	Thu 9/26/13
76	Prepare Draft RACR(7 days after Navy comments per SMP)	4 days	Fri 9/27/13	Wed 10/2/13
77	Regulator Review of Draft RACR (30 days per SMP)	21 days	Thu 10/3/13	Thu 10/31/13
78	Develop/Submit Internal Final RACR and RTCs/Participate in Working Meeting w/ Navy/Agencies (33 days per SMP)	24 days	Fri 11/1/13	Thu 12/5/13
79	Navy Review of Internal Final RACR (14 days per SMP)	10 days	Fri 12/6/13	Thu 12/19/13
80	Develop/Submit Final RACR to Agencies (14 days per SMP)	10 days	Fri 12/20/13	Thu 1/2/14
81	Agency Review of Final RACR (14 days per SMP; RACR finalized if no comments received within 14 days)	10 days	Fri 1/3/14	Thu 1/16/14



Project: CTO 0013 Draft NAVSTA TI I
Date: Tue 3/26/13

Task | Rolled Up Task | Inactive Task | Manual Task | Start-only
Critical Task | Rolled Up Critical Task | Inactive Task | Duration-only | Finish-only
Milestone | Rolled Up Progress | Inactive Milestone | Manual Summary Rollup | Progress
Summary | Group By Summary | Inactive Summary | Manual Summary

Figure 1-4 Project Schedule
NTCRA Work Plan
Naval Station Treasure Island, San Francisco, CA



BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

NTCRA WORK PLAN
INSTALLATION RESTORATION SITE 12

FIGURE 2-1

AIR MONITORING STATION LOCATIONS
NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CA

REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

TETRA TECH EC, INC.

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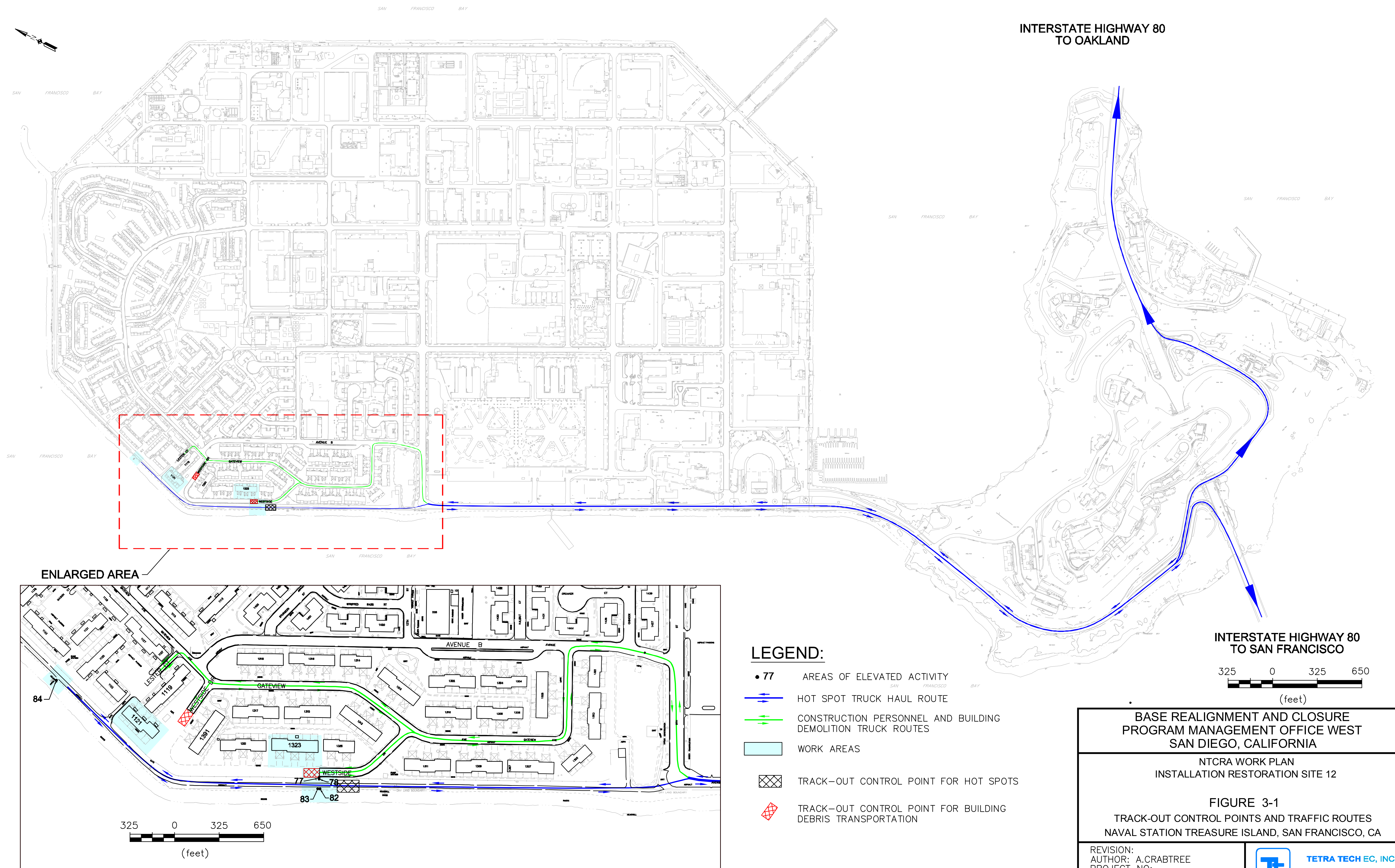

LEGEND:

- • 77 AREAS OF ELEVATED ACTIVITY
- HOT SPOT TRUCK HAUL ROUTE
- CONSTRUCTION PERSONNEL AND BUILDING DEMOLITION TRUCK ROUTES
- WORK AREAS
- TRACK–OUT CONTROL POINT FOR HOT SPOTS
- TRACK–OUT CONTROL POINT FOR BUILDING DEBRIS TRANSPORTATION

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

NTCRA WORK PLAN
INSTALLATION RESTORATION SITE 12

FIGURE 3-1

TRACK-OUT CONTROL POINTS AND TRAFFIC ROUTES
NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CA

REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

TETRA TECH EC, INC.

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9/25/12

SAP Worksheet #1 – Title and Approval Page

ATTACHMENT 1

FINAL

SAMPLING AND ANALYSIS PLAN

(Field Sampling Plan and Quality Assurance Project Plan)
April 2013

NON-TIME-CRITICAL REMOVAL ACTION FOR SOLID WASTE DISPOSAL AREA
RADIOLOGICAL HOT SPOT REMOVAL AND BUILDING DEMOLITION
INSTALLATION RESTORATION SITE 12
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

Prepared for:
Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

Prepared by:
Tetra Tech EC, Inc.
1230 Columbia Street, Suite 750
San Diego, California 92101
(619) 234-8696

Prepared under:
Contract No. N62473-10-D-0809
DCN: RMAC-0809-0013-0007
CTO No. 0013

Review Signature: Lisa A. Binkowski for Greg Joyce, TtEC Quality Control Program Manager — Date: 04/01/13

Approval Signature: Joseph Michalowski, NAVFAC SW Quality Assurance Officer — Date: April 1, 2013

EXECUTIVE SUMMARY

The Department of the Navy (DON) has contracted with Tetra Tech EC, Inc. (TtEC) to perform a non-time-critical removal action (NTCRA) involving the removal of two radiological hot spots identified in the California Department of Public Health (CDPH) Site 12 Gamma Survey Report (CDPH 2011) and the demolition of Buildings 1121 and 1323 within Installation Restoration (IR) Site 12, Naval Station Treasure Island (NAVSTA TI), San Francisco, California. This work will be conducted under Contract No. N62473-10-D-0809, Contract Task Order (CTO) No. 0013 and under TtEC's State of California Agreement State Radioactive Materials License No. 7909-01.

This Sampling and Analysis Plan (SAP) (Attachment 1 of the NTCRA Work Plan) has been prepared by TtEC to provide guidance on sampling, analysis, and quality control (QC) in support of remediation activities under this CTO. The quality assurance (QA)/QC elements in this SAP were prepared in accordance with the U.S. Environmental Protection Agency (EPA) Uniform Federal Policy for Quality Assurance Project Plans (EPA 2005) and Requirements for Quality Assurance Project Plans, EPA QA/R-5, QAMS (EPA 2006a) to ensure that all data collected are precise, accurate, representative, complete, and comparable to meet their intended use.

TtEC will use two laboratories to perform the analyses required for the remediation activities at IR Site 12. The primary laboratory used to perform radiological analyses for screening, as well as definitive data, is located at Hunters Point Naval Shipyard and is managed by Curtis and Tompkins, Ltd. as a subcontractor to TtEC. (This facility is a satellite laboratory for Curtis and Tompkins, Ltd., as their main laboratory is located in Berkeley, California.) This satellite laboratory (hereinafter referred to as Curtis and Tompkins) has received accreditation by the Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) and the CDPH National Environmental Laboratory Accreditation Program (NELAP) for gamma spectroscopy (which includes radium-226 [Ra-226]) and gross alpha/gross beta analysis of solid and swipe samples. Radiological analyses not listed in Curtis and Tompkins' DoD ELAP and CDPH NELAP accreditation and any chemical analyses discussed in this SAP will be performed by TestAmerica-St. Louis laboratory. TestAmerica-St.Louis has DoD ELAP and CDPH NELAP accreditation for all the radiological and chemical methods listed in this SAP. Further details on each laboratory are provided in SAP Worksheet #30.

BACKGROUND

NAVSTA TI is located in San Francisco Bay, midway between San Francisco and Oakland, California. The former naval station consists of two contiguous islands: Treasure Island, which is approximately 403 acres, and Yerba Buena Island, which is approximately 147 acres. Treasure Island is a manmade island constructed of materials dredged from the bay. Military activities at the former NAVSTA TI date back to 1866, before the construction of Treasure Island, when the U.S. government took possession of Yerba Buena Island for defensive fortifications. In 1993, NAVSTA TI was designated for closure under the Base Closure and Realignment Act of 1990. The naval station was closed on September 30, 1997, and is currently in the transfer process.

IR Site 12 is located on the northwest portion of NAVSTA TI on a relatively flat 93-acre area as illustrated on Figure 1. The site consists of multiplex housing units with private backyards and common area front yards, side yards, and surrounding greenbelts. The area was originally used as a parking lot during the 1939–1940 Golden Gate International Exposition. After Navy occupation of the island in 1940, the area was developed for bunker storage of munitions and other materials, vehicle equipment and storage, recreational playing fields, and disposal or burning of solid waste. Beginning in the1960s, areas of IR Site 12 were incrementally developed into housing for Navy personnel and their dependents. Former residential Buildings 1121 and 1323 are located within IR Site 12 near Westside Drive.

An NTCRA was implemented in May 2006 to remediate chemicals in soil associated with chemical/fuel storage and disposal or burning of solid waste in four Solid Waste Disposal Areas (SWDAs) (SWDA A & B, SWDA 1231/1233, SWDA 1207/1209, and SWDA Bigelow Court) located within IR Site 12. A Historical Radiological Assessment (HRA) (Weston 2006) identified the radiological contamination potential for the SWDAs as "unlikely" and recommended radiation monitoring during excavation of identified SWDAs. During the initial stages of this NTCRA, a radiation survey and sample analysis identified radium-226 (Ra-226)-impacted debris and soil in some of the SWDAs. Subsequently, an Action Memorandum (DON 2007) summarizing the site characteristics identified the chemicals of potential concern (COPCs) and the horizontal extent of the SWDAs. Generally, the radiological contamination in IR Site 12 SWDAs is colocated with chemical contaminants. The NTCRAs at IR Site 12 determined that some of the SWDAs were contaminated with radiological items or soil containing Ra-226. Elevated gamma readings were also detected along the northern and southern fence lines (two areas) of SWDA A & B by the CDPH Radiologic Health Branch (RHB) during a gamma survey conducted in April 2011. The work described herein will investigate and remediate these two areas with elevated gamma readings.

PROJECT SCOPE

The Westside Drive SWDA, also known as SWDA A & B, is an approximately 4.5-acre area on the west side of IR Site 12 abutting Perimeter Road. Two radiological hot spots were identified in the Westside Drive SWDA during the 2011 CDPH survey of this area. The source of radioactivity is believed to be near-surface radiological commodities containing Ra-226 (deck markers, foils containing radium powder, instrument gauges) but may include limited pockets of soil contamination. Based on CDPH's report, there is one area of elevated activity north of the currently established Radiologically Controlled Area (RCA) (Northern Hot Spot) and four locations of elevated activity south of the RCA (Southern Hot Spot). This NTCRA focuses only on radiological contamination in the two radiological hot spots. The ongoing NTCRA activities in the center of SWDA A & B are currently being performed by another contractor under a separate contract.

Also included in this CTO is the demolition of Buildings 1121 and 1323, which are located within SWDA A & B near Westside Drive. The scope for building demolition will include asbestos abatement of these structures by a TtEC subcontractor; radiological surveys of the buildings to determine radiological impact (if any) using AEC Regulatory Guide 1.86 established

in the IR Site 12 NTCRA Work Plan (Shaw 2007) and as described in the DON-approved TSP and technical support from the DON's RASO; demolition of the structures; disposal of debris characterized below the radiological release limit for NAVSTA TI into a California landfill or appropriate out-of-state landfill; and transfer of debris above the radiological release limit to the DON's low-level radioactive waste (LLRW) contractor for disposal.

REMOVAL ACTION OBJECTIVES

Based on past site history and results from ongoing NTCRAs, the DON has determined that chemical contamination present in soil and debris at the four SWDAs at IR Site 12 requires a response action. This decision was documented in the AM (DON 2007) and is consistent with the National Oil and Hazardous Substances Pollution Contingency Plan requirements in Title 40 *Code of Federal Regulations*, Part 300.415(b)(2). The removal action objectives for remediation activities are to implement the AM Alternative 3 and protect public health and welfare and the environment by physically removing and disposing of contaminated soil and debris that exceed the criteria for the COPCs presented in Section 2.1.4 of the AM (DON 2007). This work is being performed by another contractor under a separate contract.

After the results of ongoing NTCRAs and the CDPH gamma survey report (CDPH 2011) identified radiological contamination in SWDA A & B, the DON initiated an NTCRA, which TtEC will conduct under this CTO. This NTCRA includes 1) performing hot spot removal in two areas until the release criterion of 1 picocurie per gram above background for Ra-226 is achieved and then performing an FSS for free release of these two hot spots; and 2) demolishing Buildings 1121 and 1323. Prior to demolition of Buildings 1121 and 1323, radiological surveys of the interiors and exteriors will be performed to determine whether radiologically contaminated soil has been tracked into the buildings or whether the wind has deposited radiologically contaminated soil onto the exterior surfaces. Any areas exceeding the surface release criteria of 20 disintegrations per minute (dpm)/100 square centimeters (cm^2) alpha or 200 dpm/100 cm^2 beta removable contamination, or 100 dpm/100 cm^2 alpha or 1,000 dpm/100 cm^2 beta fixed contamination will be remediated and transferred to the DON's LLRW contractor for disposal.

REGULATORY OVERSIGHT

Environmental investigation and remediation activities are being conducted at NAVSTA TI under the DoD IR Program in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act and the NCP. Under Executive Order 12580, the DON is the lead agency responsible for implementation of the IR Program and any removal actions. The California Department of Toxic Substances Control is the lead regulatory agency. The CDPH and the Regional Water Quality Control Board San Francisco Bay Region will provide additional state regulatory oversight.

SAP Worksheets

Page

FIGURES

APPENDICES (on CD only)

SAP Worksheet #2 – SAP Identifying Information

Site Name/Number:	Non-Time-Critical Removal Action for Solid Waste Disposal Area (SWDA) – Radiological Hot Spot Removal and Building Demolition, Installation Restoration (IR) Site 12, Naval Air Station Treasure Island (NAVSTA TI)
Contractor Name:	Tetra Tech EC, Inc. (TtEC)
Contract Number:	N62473-10-D-0809
Contract Title:	Radiological Environmental Multiple Award Contract

1. This Sampling and Analysis Plan (SAP) was prepared in accordance with the requirements of the Uniform Federal Policy for Quality Assurance Project Plans (EPA 2005) and U.S. Environmental Protection Agency (EPA) Guidance for Quality Assurance Project Plans, EPA QA/G-5, QAMS (EPA 2002).

2. Identify regulatory program: Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

3. This SAP is a project-specific SAP.

4. List dates of scoping sessions that were held.

Scoping Session	Date
None	

5. List dates and titles of any SAP documents written for previous site work that are relevant to the current investigation.

Title	Date
None	

6. List organizational partners (stakeholders) and connection with lead organization: The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC), California Department of Public Health (CDPH), Regional Water Quality Control Board San Francisco Bay Region, Radiological Affairs Support Office (RASO), and United States Fish and Wildlife Service (for sensitive species) will provide regulatory oversight and guidance.

7. Lead organization: the DON

8. If any required SAP elements or required information is not applicable to the project or is provided elsewhere, then note the omitted SAP elements and provide an explanation for its exclusion below:

   - SAP Worksheet #8 (Special Personnel Training Requirements Table) is not applicable for this project as there are no special training requirements.
   - SAP Worksheet #12 (Measurement Performance Criteria Table) is applicable to the collection of field QC samples such as the following: rinsate blank sample collection

SAP Worksheet #2 – SAP Identifying Information (Continued)

from nondisposable sampling equipment to ensure that decontamination procedures are sufficiently adequate so that cross-contamination between samples is not occurring; field duplicate sample collection to document variability of the matrix being sampled. Rinsate blanks and field duplicates are not applicable to radiological projects since 1) radiological contaminants are not mobile like chemical contaminants; therefore, rinsate blanks are not needed to verify adequacy of decontamination procedures; and 2) variability of matrices such as soil are not required to meet the project objectives.

- SAP Worksheet #13 (Secondary Data Criteria and Limitations Table) is not applicable for this project as secondary data evaluation is not required.

SAP elements and required information that are not applicable to the project are noted below. An explanation is provided above and in the appropriate SAP worksheet(s), as necessary.

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
A. Project Management		
Documentation		
1	Title and Approval Page	
2	Table of Contents SAP Identifying Information	
3	Distribution List	
4	Project Personnel Sign-Off Sheet	
Project Organization		
5	Project Organizational Chart	
6	Communication Pathways	
7	Personnel Responsibilities and Qualifications Table	
8	Special Personnel Training Requirements Table	Not applicable
Project Planning/Problem Definition		
9	Project Planning Session Documentation (including Data Needs tables) Project Scoping Session Participants Sheet	
10	Problem Definition, Site History, and Background Site Maps (historical and present)	
11	Site-Specific Project Quality Objectives	
12	Measurement Performance Criteria Table for Samples	Not applicable
13	Sources of Secondary Data and Information Secondary Data Criteria and Limitations Table	Not applicable
14	Summary of Project Tasks	
15	Reference Limits and Evaluation Table	
16	Project Schedule/Timeline Table	
B. Measurement Data Acquisition		

SAP Worksheet #2 – SAP Identifying Information (Continued)

UFP-QAPP Worksheet #	Required Information	Crosswalk to Related Information
Sampling Tasks		
17	Sampling Design and Rationale	
18	Sampling Locations and Methods/ SOP Requirements Table Sampling Location Map(s)	
19	Analytical Methods/SOP Requirements Table	
20	Field Quality Control Sample Summary Table	
21	Project Sampling SOP References Table	
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	
Analytical Tasks		
23	Analytical SOPs Analytical SOP References Table	
24	Analytical Instrument Calibration Table	
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	
Sample Collection		
26	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal Sample Handling Flow Diagram	
27	Sample Custody Requirements, Procedures/SOPs Sample Container Identification Example Chain-of-Custody Form and Seal	
Quality Control Samples		
28	QC Samples Table Screening/Confirmatory Analysis Decision Tree	
Data Management Tasks		
29	Project Documents and Records Table	
30	Analytical Services Table Analytical and Data Management SOPs	
C. Assessment Oversight		
31	Planned Project Assessments Table Audit Checklists	
32	Assessment Findings and Corrective Action Responses Table	
33	QA Management Reports Table	
D. Data Review		
34	Verification (Step I) Process Table	
35	Validation (Steps IIa and IIb) Process Table	
36	Validation (Steps IIa and IIb) Summary Table	
37	Usability Assessment	

SAP Worksheet #3 – Distribution List

The following distribution list represents the recipients of the final version of this SAP.

Name of SAP Recipients	Title/Role	Organization	Telephone Number	Mailing and E-mail Address
Mr. Dave Clark	Lead Remedial Project Manager (RPM)	Base Realignment and Closure (BRAC) Program Management Office (PMO)	(619) 532-0973	1455 Frazee Road, Suite 900 San Diego, CA 92108-4310 dave.j.clark2@navy.mil
Mr. Tony Konzen	RPM	BRAC PMO	(619) 532-0924	1455 Frazee Road, Suite 900 San Diego, CA 92108-4310 anthony.konzen.ctr@navy.mil
Mr. Zachary Edwards	Radiological Environmental Protection Manager	RASO	(757) 887-7762	NAVSEA DET RASO P.O. Drawer 260, Building 1971 NWS Yorktown, VA 23691-0260 zachary.edwards@navy.mil
Mr. Joseph Michalowski	Quality Assurance Officer (QAO)	Naval Facilities Engineering Command Southwest (NAVFAC SW)	(619) 532-4125	1220 Pacific Coast Highway San Diego, CA 92132 joseph.michalowski@navy.mil
Ms. Diane Silva	Administrative Record Manager	NAVFAC SW	(619) 556-1280	1220 Pacific Highway Code EV33, NBSD Bldg. 3519 San Diego, CA 92132 diane.silva@navy.mil
Mr. Doug DeLong	Caretakers Support Office (CSO)	BRAC PMO West CSO San Francisco Bay Area	(415) 743-4713	410 Palm Ave, Building 1, Ste.161 San Francisco, CA 94130-1806 douglas.delong@navy.mil
Ms. Remedios (Medi) Sunga	Lead RPM	Cal/EPA DTSC	(510) 540-3840	700 Heinz Ave., Bldg. F, Suite 200 Berkeley, CA 94710-2721 rsunga@dtsc.ca.gov
Ms. Myriam Zech	RPM	Regional Water Quality Control Board San Francisco Bay Region	(510) 622-5684	1515 Clay Street, Suite 1400 Oakland, CA 94612 mzech@waterboards.ca.gov
Mr. David Stensby	RPM	EPA	(415) 972-3246	75 Hawthorne Street, SFD-8-1 San Francisco, CA 94105-3901 stensby.david@epa.gov

SAP Worksheet #3 – Distribution List (Continued)

Name of SAP Recipients	Title/Role	Organization	Telephone Number	Mailing and E-mail Address
Mr. Larry Morgan	Project Manager (PjM)	CDPH	(916) 449-5921	Environmental Management Branch 1616 Capital Avenue; MS 7402 P.O. Box 997413 Sacramento, CA 95899-7377 larry.morgan@cdph.ca.gov
Mr. Gene Forrer	Health Physicist	CDPH	(510) 620-3744	Radiologic Health Branch 850 Marina Way Pkwy, Bldg P, 1st Floor Richmond, CA 94804-6403 eugene.forrer@cdph.ca.gov
Mr. Gary Munekawa	Resident Officer in Charge of Construction (ROICC)	NAVFAC SW	(650) 603-9834	NAVFAC SW P.O. Box 68, Building 107 Moffett Field, CA 94035 gary.munekawa@navy.mil
Mr. David Smith	ROICC	NAVFAC SW	(650) 603-9836	NAVFAC SW P.O. Box 68, Building 107 Moffett Field, CA 94035 david.r.smith2@navy.mil
Mr. Bill Dougherty	Project Manager (PjM)	TtEC	(415) 216-2731	200 Fisher Avenue San Francisco, CA 94124 bill.dougherty@tetratech.com
Mr. Erik Abkemeier	Radiation Safety Officer (RSO)	TtEC	(757) 466-4906	Twin Oaks, Suite 309 5700 Lake Wright Drive Norfolk, VA 23502 erik.abkemeier@tetratech.com
Mr. Adam Berry	Radiation Safety Officer Representative (RSOR)	TtEC	(713) 410-7928	200 Fisher Avenue San Francisco, CA 94124 adam.berry@tetratech.com

SAP Worksheet #3 – Distribution List (Continued)

Mr. Greg Joyce	Quality Control Program Manager (QCPM)	TtEC	(360) 780-0371	1230 Columbia St., Suite 750 San Diego, CA 92101 greg.joyce@tetratech.com
Mr. Richard Kanaya	Project Quality Control Manager (PQCM)	TtEC	(415) 216-2759	200 Fisher Avenue San Francisco, CA 94124 rich.kanaya@tetratech.com
Ms. Lisa Bienkowski	Program Chemist	TtEC	(949) 809-5028	17885 Von Karman Ave., Suite 500 Irvine, CA 92614 lisa.bienkowski@tetratech.com
Ms. Sabina Sudoko	Project Chemist	TtEC	(949) 809-5022	17885 Von Karman Ave., Suite 500 Irvine, CA 92614 sabina.sudoko@tetratech.com
Mr. Richard Weingarz	Laboratory Coordinator	TtEC	(415) 216-2733	200 Fisher Avenue San Francisco, CA 94124 richard.weingarz@tetratech.com
Mr. Phil Smith	Laboratory Supervisor	Curtis and Tompkins	(415) 216-2768	201A & 201B Fisher Avenue San Francisco, CA 94124 phil.smith@ctberk.com
Ms. Erika Starman	Laboratory Project Manager	TestAmerica-St. Louis	(314) 298-8566	13715 Rider Trail North Earth City, MO 63045 erika.starman@testamericainc.com
Ms. Linda Rauto	Data Validator Project Manager	Laboratory Data Consultants (LDC)	(760) 634-0437	7750 El Camino Real, Suite 2L Carlsbad, CA 92009 lrauto@lab-data.com

SAP Worksheet #4 – Project Personnel Sign-Off Sheet

The key personnel listed below will read the final version of this SAP. Their signature and date will be filled in below and included in the project file.

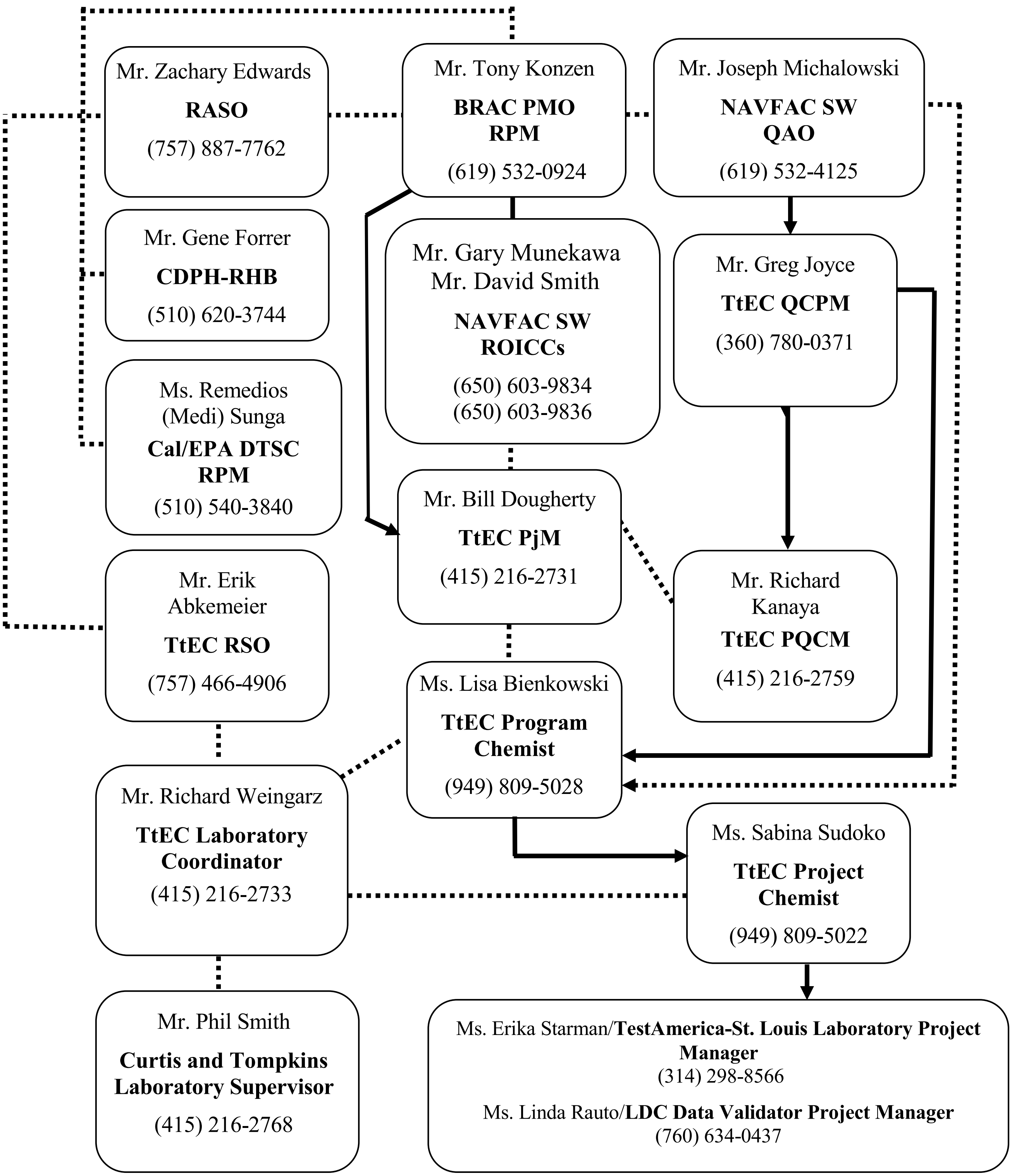
Name	Organization/Title/Role	Signature/E-mail Receipt	SAP Section Reviewed	Date SAP Read
Mr. Bill Dougherty	TtEC/PjM		Entire document	
Mr. Adam Berry	TtEC/RSOR		Entire document	
Mr. Richard Kanaya	TtEC/PQCM		Entire document	
Ms. Sabina Sudoko	TtEC/Project Chemist		Entire document	
Mr. Richard Weingarz	TtEC/Laboratory Coordinator		Entire document	
Mr. Phil Smith	Curtis and Tompkins/Laboratory Supervisor		Entire document	
Ms. Erika Starman	TestAmerica-St. Louis / Laboratory Project Manager		Entire document	
Ms. Linda Rauto	LDC/Data Validator Project Manager		Entire document	
TBD [a]	TtEC/Field Crews		Entire document	

Notes:

[a] Field crews include multiple persons and vary from project to project. Therefore, persons identified by the PQCM will read the SAP and sign this worksheet as required.

SAP Worksheet #5 – Project Organizational Chart

Lines of Authority ——— ········ Lines of Communication



SAP Worksheet #6 – Communication Pathways

Communication Drivers	Responsible Affiliation	Name	Phone Number	Procedure
Point of contact for DON quality issues	NAVFAC SW QAO	Mr. Joseph Michalowski	(619) 532-4125	SAP and its addendum (if applicable) will be approved by the QAO prior to start of sampling. If during sampling, a major change in sampling procedures or strategy is required, the QAO will be notified via e-mail and give concurrence to issue a field change request or SAP addendum. In addition, the QAO has the authority to suspend project execution if quality assurance requirements are not adequately followed.
Point of contact for contractor quality issues	TtEC QCPM	Mr. Greg Joyce	(360) 780-0371	The QCPM is responsible for overseeing program quality control (QC), including construction and analytical data acquisition. The QCPM has the authority to suspend project activities if quality standards are not maintained.
Project management	TtEC PjM	Mr. Bill Dougherty	(415) 216-2731	If changes are necessary, the PjM is responsible for communicating the changes via phone and/or e-mail to the project staff and is authorized to stop work, if necessary.
SAP review and radiological concurrence	RASO	Mr. Zachary Edwards	(757) 887-7762	The RASO will review and concur with the SAP as related to the radiological aspects of NAVSTA TI.
SAP review	TtEC Program Chemist TtEC QCPM	Ms. Lisa Bienkowski Mr. Greg Joyce	(949) 809-5028 (360) 780-0371	The SAP will be written by the Program Chemist and reviewed by the QCPM prior to submittal to the NAVFAC SW QAO for review.
Notification of nonusable analytical results	TtEC Program Chemist	Ms. Lisa Bienkowski	(949) 809-5028	If significant problems are identified by the laboratories or the project team that impact the usability of the analytical results (i.e., the result is rejected or data quality objectives are not met), the Program Chemist will notify the NAVFAC SW RPM and QAO within 24 hours.

SAP Worksheet #6 – Communication Pathways (Continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number	Procedure
Coordination of laboratory supplies for field sampling activities	TtEC Project Chemist or TtEC Laboratory Coordinator	Ms. Sabina Sudoko Mr. Richard Weingarz	(949) 809-5022 (415) 216-2733	The Project Chemist will contact TestAmerica-St. Louis to provide any necessary sample containers and appropriate shipping materials (such as coolers and bubble wrap) to be delivered on-site prior to commencement of field sampling activities and throughout the course of the project. The Laboratory Coordinator will ensure that Curtis and Tompkins provides necessary sample containers for analyses that they will perform.
Submittal of samples to the laboratories	TtEC Laboratory Coordinator	Mr. Richard Weingarz	(415) 216-2733	The samplers will either transfer samples to Curtis and Tompkins or ship samples to TestAmerica-St. Louis at the end of each day. These activities will be overseen by the Laboratory Coordinator. For any samples shipped to TestAmerica-St. Louis, the Laboratory Coordinator will inform the Project Chemist.
Reporting laboratory data quality issues or analytical corrective actions	Curtis and Tompkins Laboratory Supervisor TestAmerica-St. Louis Laboratory Project Manager	Mr. Phil Smith Ms. Erika Starman	(415) 216-2768 (314) 298-8566	All Curtis and Tompkins data quality issues will be reported in writing by the Laboratory Supervisor to the RSO and Program Chemist within 24 hours. All TestAmerica-St. Louis data quality issues will be reported in writing by the Laboratory Project Manager to the Project Chemist and Program Chemist within 24 hours. Any corrective actions will be documented and verified by the Program Chemist who will notify in writing the QCPM, RSO, and PjM. The PjM will notify the BRAC PMO RPM and RASO.
Field corrective actions	TtEC PQCM	Mr. Richard Kanaya	(415) 216-2759	All field corrective actions will be documented in writing by the PQCM who will notify in writing the QCPM, RSO, and PjM. The PjM will notify the BRAC PMO RPM and RASO.

SAP Worksheet #6 – Communication Pathways (Continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number	Procedure
Release of Curtis and Tompkins analytical results	TtEC RSO	Mr. Erik Abkemeier	(757) 466-4906	The RSO (or designee) will review Curtis and Tompkins analytical results to verify that the requirements in this SAP have been met prior to releasing the data to the project team for evaluation.
Release of TestAmerica-St. Louis analytical results	TtEC Project Chemist	Ms. Sabina Sudoko	(949) 809-5022	The Project Chemist will review TestAmerica-St. Louis analytical results to verify that the requirements in this SAP have been met prior to releasing the data to the project team for evaluation.
Review of radiological data and concurrence on radiological actions	RASO	Mr. Zachary Edwards	(757) 887-7762	The RASO will review all appropriate radiological data provided by the RSO (or designee) and will provide concurrence with actions proposed.
SAP procedure revision during field activities	TtEC Program Chemist	Ms. Lisa Bienkowski	(949) 809-5028	The Program Chemist (or designee) will prepare a Field Change Request (FCR) for any minor changes in sampling procedures that occur due to conditions in the field.
SAP addendums	TtEC Program Chemist	Ms. Lisa Bienkowski	(949) 809-5028	Significant changes to the SAP such as additional scope of work that is not covered in this SAP will require that the Program Chemist prepare a SAP addendum, which will be reviewed and approved by the NAVFAC SW QAO prior to initiating the affected field activities.

SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table

Name	Title/Role	Organizational Affiliation	Responsibilities
Mr. Joseph Michalowski	QAO	NAVFAC SW	• Reviewing and approving this SAP • Providing DON oversight of TtEC's Quality Assurance (QA) Program • Providing technical and administrative oversight of TtEC's surveillance audit activities • Acting as point of contact for matters concerning QA and the Department of Defense's (DoD) Laboratory QA Program • Coordinating training on matters pertaining to generation and maintenance of quality of data • Authorizing the suspension of project execution if QA requirements are not adequately followed
Mr. Greg Joyce	QCPM	TtEC	• Establishing and maintaining the Quality Program • Overseeing program QC, including construction and analytical data acquisition • Working directly with the PjM and the DON to ensure implementation of the program QC Plans • Acting as a focal point for coordination for quality matters across all projects and resolving quality issues • Suspending project activities if quality standards are not maintained • Interfacing with the DON, including NAVFAC SW QAO, on quality-related items • Conducting field QC audits to ensure project plans are being followed • Performing reviews of audit and surveillance reports conducted by others • Implementing the DON technical direction letters related to quality topics • Approving any FCRs and reviewing addendums to the SAP
Mr. Tony Konzen	RPM	BRAC PMO	• Performing project management for the DON • Ensuring that the project scope of work requirements are fulfilled • Overseeing the project cost and schedule • Providing formal technical direction to the TtEC project team, as needed • Acting as lead interface with agencies
Mr. Bill Dougherty	PjM	TtEC	• Coordinating work activities of subcontractors and TtEC personnel, and ensuring that

SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table (Continued)

Name	Title/Role	Organizational Affiliation	Responsibilities
			all personnel adhere to the administrative and technical requirements of the project • Monitoring and reporting the progress of work, and ensuring that the project deliverables are completed on time and within project budget • Monitoring the budget and schedule, and notifying the RPM of any changes that may require administrative actions • Ensuring adherence to the quality requirements of the contract, project scope of work, and the QC plans • Ensuring that all work meets the requirements of the technical specifications and complies with applicable codes and regulations • Ensuring that all work activities are conducted in a safe manner in accordance with the Site-Specific Safety and Health Plan, United States Army Corps of Engineers' Safety and Health Requirements (Engineer Manual 385-1-1), and all applicable Occupational Safety and Health Administration (OSHA) regulations • Serving as the primary contact between the DON and TtEC for actions and information related to the work and including appropriate TtEC technical personnel in the decision-making • Coordinating satisfactory resolution and completion of evaluation and acceptance report for nonconformance reports • Suspending project activities if standards are not maintained

SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table (Continued)

Name	Title/Role	Organizational Affiliation	Responsibilities
Mr. Zachary Edwards	Radiological Environmental Protection Manager	RASO	• Reviewing radiological laboratory data on a routine basis • Reviewing and approving all radiological management plans and final reports • Providing review and concurrence on data for proposed radiological actions • Ensuring that all necessary sample results are provided and are consistent with proposed radiological actions • Comparing radiological data with the requirements of the NTCRA Work Plan, Task-specific Plans, and SAP to ensure that all proper conditions have been met to implement the action requested
Mr. Erik Abkemeier	RSO	TtEC	• Overseeing overall radiological operations and documentation for the project • Supporting projects as the technical lead for radiological data collection and analysis • Ensuring that RSOR and field sampling personnel have adequate training in radiological sample collection • Receiving and reviewing radiological data from the laboratories to ensure the data quality objectives have been met • Reviewing and evaluating scan survey data and requiring additional scan data, as necessary The RSO (or designee) will also perform the following: • Concurring on the identification of elevated areas for collection of biased samples and the locations of systematic samples including plotting of those samples on maps • Overseeing the preparation of a remediation plan and the performance of remediation activities (including evaluating biased sampling data) when sampling activities indicate the presence of radioactive materials at levels above the release criteria • Recommending radiological activities to the RASO for concurrence including additional sampling, backfilling of trenches, identification of material that can be used as backfill, etc. • Identifying samples to be forwarded to TestAmerica-St. Louis laboratory for additional radiological testing not performed by Curtis and Tompkins

SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table (Continued)

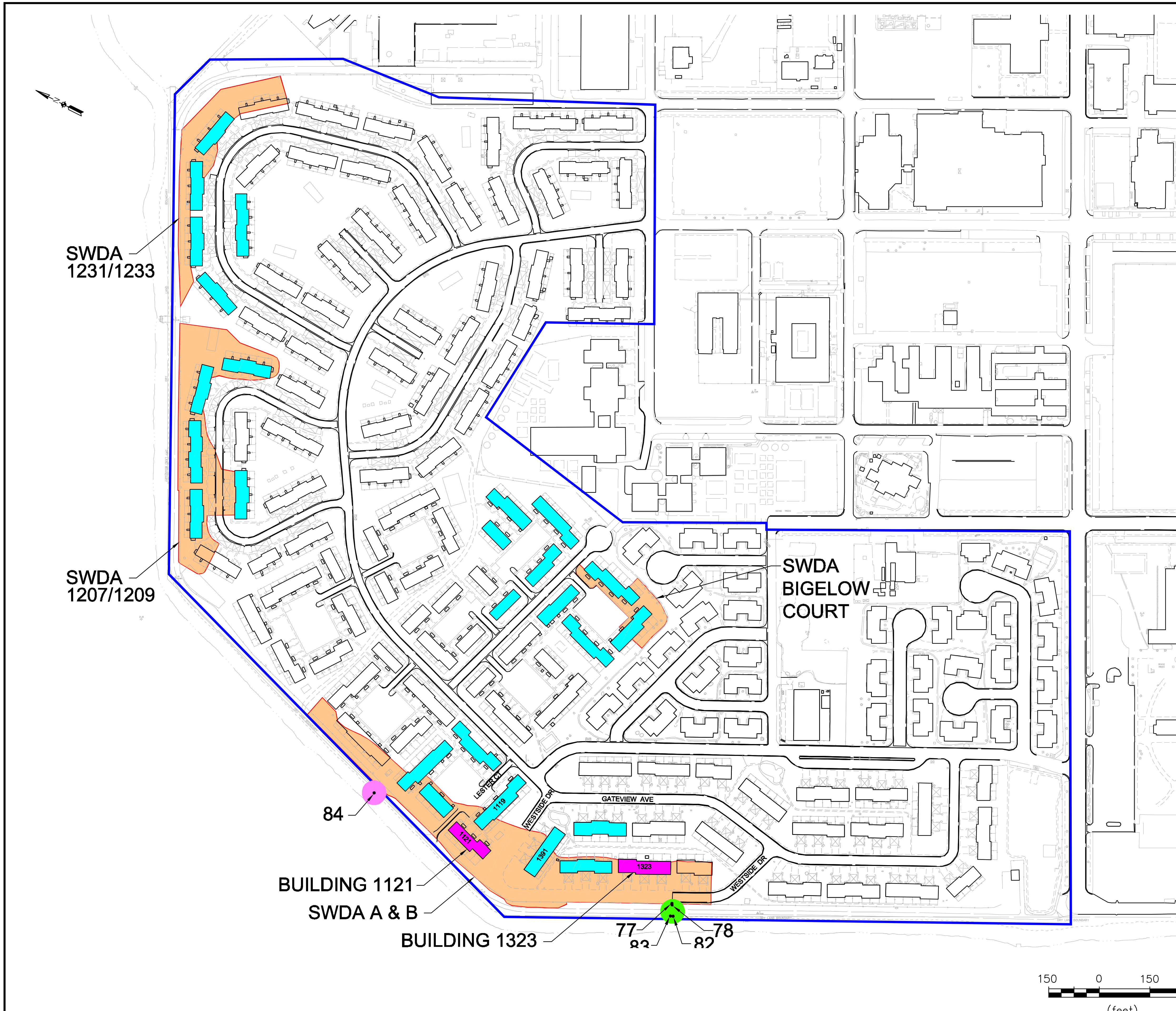
Name	Title/Role	Organizational Affiliation	Responsibilities
Mr. Adam Berry	RSOR	TtEC	• Supervising day-to-day radiological operations • Ensure site activities are in compliance with State of California Agreement State Radioactive Materials License No. 7909-01. • Overseeing performance of radiological static surveys
Ms. Lisa Bienkowski	Program Chemist	TtEC	• Developing the SAP and any addendums to the SAP • Implementing contract requirements for data collection • Supporting projects as the technical lead for data collection and analysis • Evaluating and selecting qualified laboratories and third-party data validation subcontractor • Providing oversight of the laboratories with regards to deliverable requirements for samples representing definitive data • Monitoring performance of the laboratories and data validator • Overseeing preparation of the Navy Electronic Data Deliverable (NEDD) deliverable to the Naval Installation Restoration Information Solution (NIRIS) website of the analytical results • Coordinating submittal of hard-copy analytical data packages with DON Administrative Record
Mr. Richard Weingarz	Laboratory Coordinator	TtEC	• Overseeing submittal of samples to Curtis and Tompkins or TestAmerica-St. Louis laboratories. • Prioritizing sample analyses, as necessary • Coordinating shipment of samples to TestAmerica-St. Louis for analysis with the Project Chemist

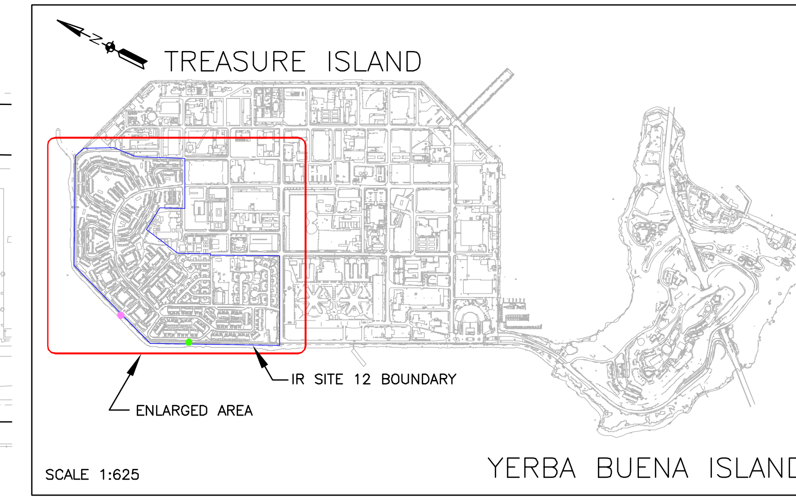
SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table (Continued)

Name	Title/Role	Organizational Affiliation	Responsibilities
Ms. Sabina Sudoko	Project Chemist	TtEC	• Tracking samples sent to TestAmerica-St. Louis to ensure laboratory receipt of samples and proper login of samples for analysis • Tracking receipt of analytical results from TestAmerica-St. Louis • Reviewing TestAmerica-St. Louis analytical results against requirements in this SAP prior to distribution to the project team • Coordinating with Laboratory Coordinator regarding deliverables for Curtis and Tompkins results that represent definitive data • Coordinating third-party data validation of all definitive laboratory data • Reviewing data validation reports • Coordinating upload of electronic data to database
Mr. Phil Smith	Laboratory Supervisor	Curtis and Tompkins	• Providing day-to-day technical and administrative oversight of the laboratory including sample login, preparation, and analysis • Performing periodic source checks, background checks and detector calibrations. • Reviewing sample analytical results prior to release to project team to ensure the SAP requirements are met • Ensuring that reporting requirements are in conjunction with SAP Worksheets #15.1, 28.1, and 29

SAP Worksheet #7 – Personnel Responsibilities and Qualifications Table (Continued)

Name	Title/Role	Organizational Affiliation	Responsibilities
Ms. Erika Starman	Laboratory Project Manager	TestAmerica-St. Louis	• Coordinating with the Project Chemist regarding sample receipt and discrepancies • Ensuring samples are logged in according to the chain of custody (COC) • Checking that analytical results are produced in accordance with this SAP and providing those results to the Project Chemist at the expected turnaround time • Ensuring that analytical data packages and electronic deliverable requirements are in accordance with SAP Worksheet #29
Ms. Linda Rauto	Data Validator Project Manager	LDC	• Coordinating with Project Chemist regarding data validation requirements in accordance with this SAP • Providing data validation reports and electronic deliverables to the Project Chemist in accordance with this SAP





LEGEND:

- IR SITE 12 BOUNDARY
- SOLID WASTE DISPOSAL AREAS (SWDAs)
- • 77 AREAS OF ELEVATED ACTIVITY
- BUILDINGS TO BE DEMOLISHED
- BUILDINGS
- UNOCCUPIED BUILDINGS
- NORTHERN HOT SPOT (INCLUDES SAMPLE ID 84)
- SOUTHERN HOT SPOT (INCLUDES SAMPLE IDS 77, 78, 82, AND 83)

CDPH Elevated Activity Data

Sample ID	Longitude	Latitude	Exposure Rate one meter (μR/hr)	Exposure Rate contact (μR/hr)	Dose Rate one meter (μrem/hr)	Dose Rate contact (μrem/hr)	Gamma Count Rate contact (cpm)
77	-122.3780747	37.82557866	8	800	4	500	349224
78	-122.3780826	37.82557246	8	11	4	13	53735
82	-122.3781783	37.825522	6.5	90	4	80	155981
83	-122.3781904	37.82554082	6	28	5	10	24428
84	-122.378509	37.8281435	12.5	600	5	450	880097

Source: CDPH 2011

NOTE:
AREAS OF ELEVATED ACTIVITY (77, 78, 82, 83, AND 84) BASED ON CALIFORNIA DEPARTMENT OF PUBLIC HEALTH SURVEY PERFORMED IN APRIL 2011 (TREASURE ISLAND, SITE 12 GAMMA SURVEY REPORT, SURVEY DATES: APRIL 5-7, 2011 DATED SEPTEMBER 23, 2011).

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

NTCRA SAMPLING AND ANALYSIS PLAN
INSTALLATION RESTORATION SITE 12

FIGURE 1

SITE LOCATION MAP
NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CA

REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

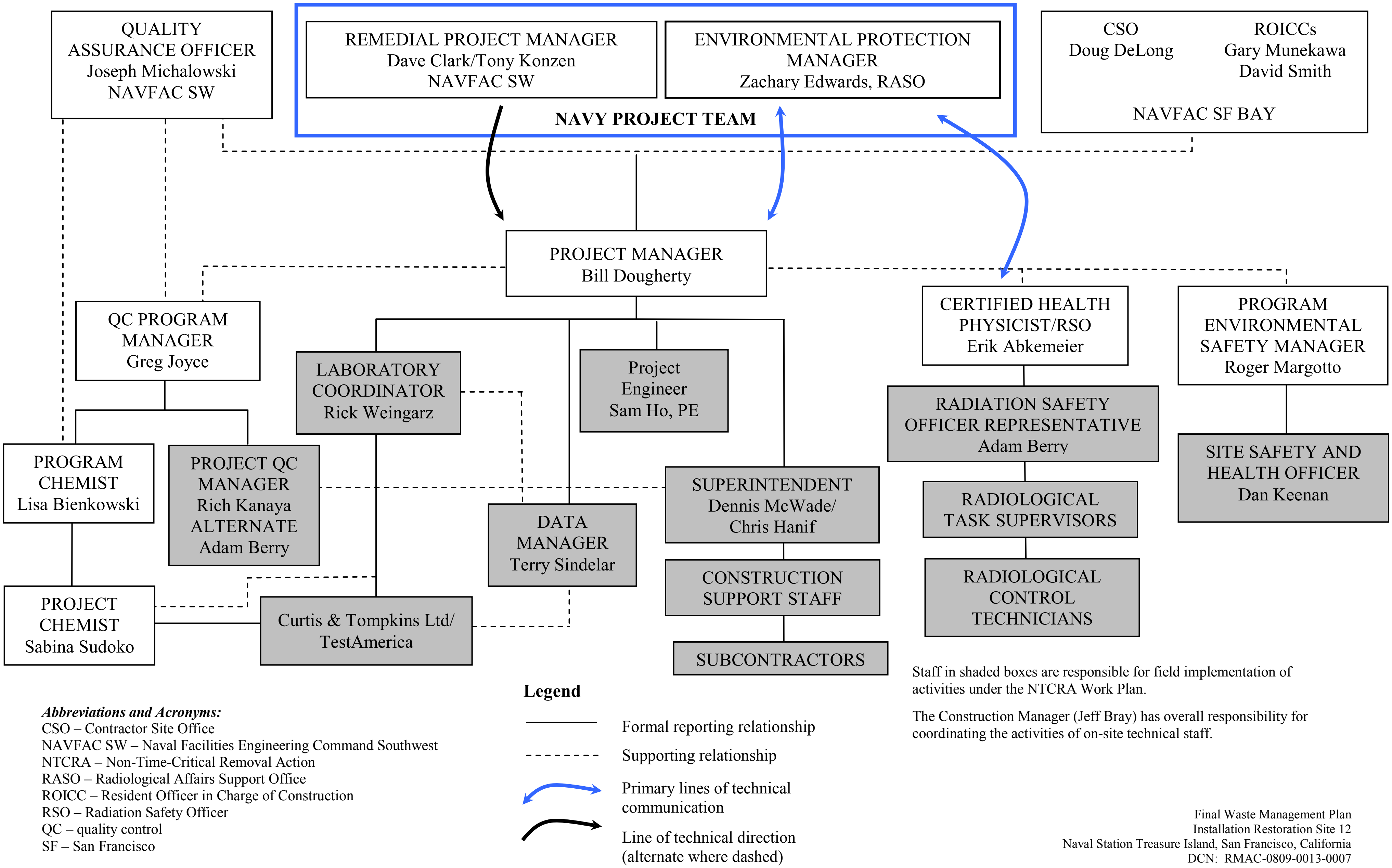
TETRA TECH EC, INC.

P:\CAD Project Files\Treasure Island CAD Files\DWG\TI-NTCRA_Figure 1-1.dwg

12/4/12

FIGURE 1-1

PROJECT ORGANIZATION CHART



Staff in shaded boxes are responsible for field implementation of activities under the NTCRA Work Plan.

The Construction Manager (Jeff Bray) has overall responsibility for coordinating the activities of on-site technical staff.

Abbreviations and Acronyms:
CSO – Contractor Site Office
NAVFAC SW – Naval Facilities Engineering Command Southwest
NTCRA – Non-Time-Critical Removal Action
RASO – Radiological Affairs Support Office
ROICC – Resident Officer in Charge of Construction
RSO – Radiation Safety Officer
QC – quality control
SF – San Francisco

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-10-D-0809
CTO NO. 0013

FINAL

POST CONSTRUCTION SUMMARY REPORT FOR SOLID WASTE DISPOSAL AREA A&B NON-TIME CRITICAL REMOVAL ACTION PHASE II, AND RADIOLOGICAL REMOVAL NEAR BUILDINGS 1128, 1303, AND 1306

May 2014

DCN: RMAC-0809-0013-0011

INSTALLATION RESTORATION SITE 12
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-10-D-0809
CTO NO. 0013

FINAL

POST CONSTRUCTION SUMMARY REPORT FOR SOLID WASTE DISPOSAL AREA A&B NON-TIME CRITICAL REMOVAL ACTION PHASE II, AND RADIOLOGICAL REMOVAL NEAR BUILDINGS 1128, 1303, AND 1306

May 2014

INSTALLATION RESTORATION SITE 12
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

DCN: RMAC-0809-0013-0011

TETRA TECH EC, INC.

1230 Columbia Street, Suite 750
San Diego, California 92101-8536

Bill Dougherty — May 9, 2014
Bill Dougherty — Date
TtEC Project Manager

Erik J. Abkemeier — May 9, 2014
Erik Abkemeier, CHP, PE, CSP, CHMM — Date
TtEC Radiation Safety Officer

EXECUTIVE SUMMARY

This Post Construction Summary Report (PCSR) describes and summarizes the removal of soil from two locations with elevated gamma readings identified by the California Department of Public Health (CDPH) along the northern and southern Solid Waste Disposal Area (SWDA) A&B fence line. It also describes the radiological survey and demolition of Buildings 1121 and 1323 in SWDA A&B. These locations are within Installation Restoration (IR) Site 12 at Naval Station Treasure Island (NAVSTA TI) in San Francisco, California. The hot spot area radiological removal action was performed to protect public health and welfare and the environment from actual or potential releases of radiological contaminants as part of the ongoing non-time critical removal action (NTCRA) for IR Site 12. Buildings 1121 and 1323 were surveyed and demolished, except for the concrete foundations, to allow for the future removal of contaminated soil that may be present underneath the buildings. This PCSR does not address chemical contamination within SWDA A&B or potential radiological contamination present at other areas within the SWDAs.

An NTCRA was started in 2007 to remediate chemicals in soil associated with chemical/fuel storage and disposal or burning of solid waste in four SWDAs (SWDA A&B, SWDA 1231/1233, SWDA 1207/1209, and SWDA Bigelow Court) within IR Site 12. During the initial stages of the NTCRA, a radiation survey and sample analysis identified radium-226 (Ra-226) commodities, impacted debris, and soil. Subsequently, radiological contamination has been addressed during the NTCRA for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) contaminants.

Because Buildings 1121 and 1323 are located within SWDA A&B, these buildings were radiologically scanned prior to demolition. This was to ensure that radiologically contaminated building debris would not end up in a California landfill.

The IR Site 12 removal actions for SWDA A&B hot spot areas and the building survey and demolition activities were performed in accordance with the requirements of CERCLA of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan. The radiological work was performed under Tetra Tech EC, Inc.'s (TtEC's) CDPH Service Provider Radioactive Material License.

The NTCRA activities were performed between April 17, 2013 and December 23, 2013. Buildings 1121 and 1323 preparation, asbestos abatement, radiological survey, and demolition activities were conducted between April 17, 2013 and December 6, 2013, and the radiological hot spot removal activities were performed between May 30, 2013 and June 5, 2013. Site restoration activities were completed on December 11, 2013, and the transport and disposal of

the wastes generated from the demolition of Buildings 1121 and 1323 were completed on December 23, 2013. As the area around Building 1121 and the laydown area, Lester Court, were not radiologically cleared, TtEC performed additional characterization surveys and soil sampling of the area around Building 1121 and characterization surveys at Lester Court to determine Radiation Work Permit requirements. The survey results indicated that these areas could be down posted from a Contaminated Area to a Radiologically Controlled Area.

After preparation of Building 1121 for radiological surveys and completion of asbestos abatement by Bayview Environmental Services, Inc. (Bayview), radiological survey activities commenced on June 28, 2013, and the final survey data were collected on August 16, 2013. The survey data confirmed that the building had not been radiologically impacted. The survey results were below the release criteria of 20 disintegrations per minute (dpm)/100 square centimeters (cm^2) alpha or 1,000 dpm/100 cm^2 beta removal contamination, or 100 dpm/100 cm^2 alpha or 5,000 dpm/100 cm^2 beta fixed contamination. Upon receipt of both CDPH's and the Department of the Navy's (DON's) concurrence to proceed with demolition on September 6, 2013, this building was demolished except for the concrete foundation.

The Building 1121 debris was shipped for off-site disposal between September 9, 2013 and December 23, 2013. A total of 29 household appliances were transported by Eighteen Trucking to Recology Hay Road Landfill; 161.61 tons of nonhazardous building demolition debris was transported by Eighteen Trucking and C&K Trucking to Recology Hay Road Landfill; 14.76 tons of building demolition debris with lead paint was transported by Sanchez Transport, Inc. to Clean Harbors Buttonwillow Landfill; 20 cubic yards of asbestos waste was transported by World Environmental and Energy to Recology Hay Road Landfill; and one 5-gallon bucket of universal waste was transported by Eighteen Trucking to Clean Harbors San Jose LLC. Site restoration activities were completed on September 20, 2013.

After preparation of Building 1323 for radiological surveys and completion of asbestos abatement (not including the sheetrock and roof penetrations), radiological survey activities commenced on July 18, 2013, and the final survey data were collected on October 3, 2013. The survey data confirmed that the building had not been radiologically impacted. The survey results were below the release criteria of 20 dpm/100 cm^2 alpha or 1,000 dpm/100 cm^2 beta removal contamination, or 100 dpm/100 cm^2 alpha or 5,000 dpm/100 cm^2 beta fixed contamination. Upon DON concurrence to resume asbestos abatement activities on October 29, 2013, Bayview remobilized to Building 1323 and completed the abatement of the sheetrock and roof penetrations on November 20, 2013. Upon receipt of both CDPH's and the DON's concurrence to proceed with demolition on November 12, 2013 and November 21, 2013, respectively, this building was demolished except for the concrete foundation.

The Building 1323 debris was shipped for off-site disposal between December 2, 2013 and December 23, 2013. A total of 144.32 tons of nonhazardous building demolition debris was

transported by C&K Trucking, J&G Trucking, and H&J Trucking to Recology Hay Road Landfill; 230 cubic yards of asbestos waste was transported by World Environmental and Energy to Recology Hay Road Landfill; and two 55-gallon drums of asbestos mastic were transported by Bayview and KM Industrial, Inc. to Crosby and Overton, Inc. The universal waste present in the building was transported by Eighteen Trucking to Clean Harbors San Jose LLC along with the universal waste from Building 1121. The 29 household appliances located in Building 1323 were transported by Eighteen Trucking to Recology Hay Road Landfill for disposal along with the appliances from Building 1121. Site restoration activities were completed on December 11, 2013.

Radiological surveys were conducted to identify the location of the two areas of elevated gamma activity identified by CDPH, which led to the identification of a total of nine discreet areas of elevated activity in close proximity. Soil removal was performed until the post-remediation soil samples indicated that all samples met the screening criterion of 1 picocurie per gram (pCi/g) above the NAVSTA TI background reference area of 0.7 pCi/g for Ra-226 and that the remaining Ra-226 concentration in the soil was similar to background concentrations. The maximum detected gross concentration in the post-remediation soil samples was 1.17 pCi/g. A total of twenty-two 5-gallon buckets of contaminated soil and one radium commodity were transferred to the DON's low-level radioactive waste (LLRW) contractor, Environmental Management Services, for disposal as LLRW.

With the removal of the radiologically impacted soil along the SWDA A&B fence line and the removal of Buildings 1121 and 1323, the project objectives have been achieved. The radiological removal action objective to protect public health and welfare and the environment from actual or potential releases of radiological contaminants has been achieved with the removal of the radiologically impacted soil along the SWDA A&B fence line. The project objective to allow access for future removal of contaminated soil that may be present underneath Buildings 1121 and 1323 has been achieved with the demolition and removal of these buildings.

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1.0 INTRODUCTION

This Post Construction Summary Report (PCSR) describes and summarizes the removal of soil from two locations with elevated gamma readings identified by the California Department of Public Health (CDPH) along the northern and southern Solid Waste Disposal Area (SWDA) A&B fence line. It also describes the removal of five locations with elevated gamma readings identified by CDPH outside SDWA A&B, as well as describes the radiological survey and demolition of Buildings 1121 and 1323 in SWDA A&B. These locations are within Installation Restoration (IR) Site 12 at Naval Station Treasure Island (NAVSTA TI) in San Francisco, California. The hot spot area radiological removal action was performed to protect public health and welfare and the environment from actual or potential releases of radiological contaminants as part of the ongoing non-time critical removal action (NTCRA) for IR Site 12. Buildings 1121 and 1323 were surveyed and demolished to allow for the future removal of contaminated soil that may be present under the buildings. This PCSR does not address chemical contamination within SWDA A&B or potential radiological contamination present at other areas within the SWDAs.

The Department of the Navy (DON), Naval Facilities Engineering Command Southwest, with the support of the Radiological Affairs Support Office (RASO) directed the IR Site 12 SWDA A&B hot spot area removal activities and building survey and demolition activities under Contract No. N62473-10-D-0809, Contract Task Order (CTO) No. 0013. The removal actions were performed in accordance with the final NTCRA Work Plan for IR Site 12 Hot Spots and Buildings 1121 and 1323 (TtEC 2013a), Task-Specific Plan for the Buildings 1121 and 1323 Characterization Survey (TtEC 2013b), Demolition Work Procedure for Buildings 1121 and 1323 (TtEC 2013c), Accident Prevention Plan/Site Safety and Health Plan (TtEC 2012), and Field Change Requests 2013-CTO13-001, 2013-CTO13-002, 2013-CTO13-003, and 2013-CTO13-008 provided in Appendix A.

The removal actions were performed in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The radiological work was performed under Tetra Tech EC, Inc.'s (TtEC's) CDPH Service Provider Radioactive Material License (RML).

1.1 NAVAL STATION TREASURE ISLAND LOCATION AND DESCRIPTION

NAVSTA TI is located in San Francisco Bay, midway between San Francisco and Oakland, California (Figure 1-1). The former naval station consists of two contiguous islands: Treasure Island, which is approximately 403 acres, and Yerba Buena Island, which is approximately

147 acres. Treasure Island is a manmade island constructed of materials dredged from the bay. Military activities at the former NAVSTA TI date back to 1866, before the construction of Treasure Island, when the U.S. government took possession of Yerba Buena Island for defensive fortifications. In 1993, NAVSTA TI was designated for closure under the Base Closure and Realignment Act of 1990. The naval station was closed on September 30, 1997, and is currently in the transfer process.

1.2 IR SITE 12 HISTORY

IR Site 12 is located on the northwest portion of NAVSTA TI on a relatively flat 93-acre area (Figure 1-2). The site consists of multiplex housing units with private backyards and common area front yards, side yards, and surrounding greenbelts. The area was originally used as a parking lot during the 1939–1940 Golden Gate International Exposition. After Navy occupation of the island in 1940, the area was developed for bunker storage of munitions and other materials, vehicle equipment and storage, recreational playing fields, and disposal or burning of solid waste. Beginning in the 1960s, areas of IR Site 12 were incrementally developed into housing for Navy personnel and their dependents. Former residential Buildings 1121 and 1323 are located within IR Site 12 near Westside Drive, within SWDA A&B (Figure 1-2).

An NTCRA was started in 2007 to remediate chemicals in soil associated with chemical/fuel storage and disposal or burning of solid waste in four SWDAs (SWDA A&B, SWDA 1231/1233, SWDA 1207/1209, and SWDA Bigelow Court) located within IR Site 12. The four SWDAs were identified as the primary areas of release through evaluation of historical site data (aerial photographs, reports, and construction drawings) and site investigation (trenching, borings, inspection, and sample collection) (DON 2007). During the initial stages of the NTCRA, a radiation survey and sample analysis identified radium-226 (Ra-226) commodities, impacted debris, and soil. Subsequently, radiological contamination has been addressed during the NTCRA for the CERCLA contaminants.

In April 2011, CDPH performed a gamma survey of publicly accessible areas around SWDA A&B (CDPH 2011) (Figure 1-2). Elevated gamma readings were detected along the northern and southern fence lines (two areas). The source of radioactivity was believed to be near-surface radiological commodities containing Ra-226 (e.g., deck markers, foils containing radium powder, and instrument gauges) and may include limited pockets of soil contamination. To ensure the health and safety of the public, fencing was installed around the locations with elevated readings. Buildings 1121 and 1323 are located within SWDA A&B.

In mid-March 2013, CDPH selected areas to perform public health and screening activities within the accessible areas at IR Site 12. The screening results indicated the presence of Ra-226 at elevated readings at five locations. At the direction of the DON, TtEC performed an expedited radiological investigation and mitigation action on March 20 and March 21, 2013, to protect

public health and welfare and the environment. The investigation and removal activities are summarized in the Radiological Investigation and Source Removal report provided in Appendix B.

Due to site conditions identified during the NTCRA and the CDPH gamma survey report (CDPH 2011) identifying radiological contamination in SWDA A&B, the DON initiated this project. The project objectives for this phase of the NTCRA were to address radiological contamination in SWDA A&B by: 1) performing hot spot removal in two areas along the SWDA A&B fence line until the release criterion for Ra-226 was achieved and the results were similar to reference area results; and 2) demolishing Buildings 1121 and 1323, except for the concrete foundations, to allow future access to the soil underneath the buildings.

1.3 RELEASE CRITERIA

The DON-established release criteria for Ra-226 in soil were 1 picocurie per gram (pCi/g) above the NAVSTA TI background reference area of 0.7 pCi/g for Ra-226 (Shaw 2012) and, at the request of CDPH, that the remaining Ra-226 concentration in the soil be similar to background concentrations. The release criteria established for the building surfaces based on the Atomic Energy Commission (AEC) Regulatory Guide 1.86 (AEC 1974) were 20 disintegrations per minute (dpm)/100 square centimeters (cm^2) alpha or 1,000 dpm/100 cm^2 beta removable contamination, or 100 dpm/100 cm^2 alpha or 5,000 dpm/100 cm^2 beta fixed contamination.

1.4 PHOTOGRAPHS

A photographic record was used to document the work performed during the IR Site 12 SWDA A&B hot spot area removal activities, and building survey and demolition activities. Photographs are provided in a separate section of this PCSR prior to the appendices.

1.5 PURPOSE AND ORGANIZATION OF REPORT

The purpose of this PCSR is to describe and summarize the NTCRA performed to protect public health and welfare and the environment from actual or potential releases of radiological contaminants from two locations along the SWDA A&B fence line and to allow future removal of contaminated soil that may be present underneath Buildings 1121 and 1323. This PCSR is organized as follows:

- **Section 1.0 Introduction –** Section 1.0 provides project information including descriptions of NAVSTA TI and IR Site 12, removal action objectives, release criteria, fieldwork photographic documentation, and the purpose and organization of this PCSR document.
- **Section 2.0 Removal Actions –** Section 2.0 provides a summary of the SWDA A&B hot spot and Buildings 1121 and 1323 removal actions.

- **Section 3.0 Sample Data and Analysis –** Section 3.0 provides an evaluation of the survey and soil sample data compared to the release criteria and a discussion of how the field activities met the as low as reasonably achievable (ALARA) concept.
- **Section 4.0 Conclusions –** Section 4.0 presents the conclusions to the IR Site 12 SWDA A&B hot spot and Building 1121 and 1323 removal activities.
- **Section 5.0 References –** Section 5.0 lists the documents cited in this PCSR.
- **Appendix A –** Appendix A contains copies of the Field Change Requests describing the DON-approved field changes implemented as compared to what was provided in the DON-approved project plans.
- **Appendix B –** Appendix B contains the Radiological Investigation and Source Removal on March 20 and 21, 2013 Report for the expedited response action performed by TtEC to protect public health and welfare and the environment.
- **Appendix C –** Appendix C contains copies of the asbestos abatement notifications submitted by Bayview Environmental, LLC (Bayview) and a report summarizing their abatement activities.
- **Appendix D –** Appendix D contains copies of the various permits, notifications, pre-construction/kick-off meeting minutes, and 24-hour work notices submitted.
- **Appendix E –** Appendix E contains copies of the calibration certificates for the instrumentation used during the survey activities.
- **Appendix F –** Appendix F contains copies of the air monitoring data collected during the hot spot excavation and building demolition activities.
- **Appendix G –** Appendix G contains a copy of the DON-approved import material acceptance package containing the results of the radiological, chemical, asbestos, and geotechnical analyses.
- **Appendix H –** Appendix H contains copies of the DON-approved final site walk inspection forms documenting the DON's concurrence that the field activities were completed in accordance with the CTO No. 0013 statement of work and the contract requirements have been met.
- **Appendix I –** Appendix I contains the Building 1121 and Lester Court characterization survey and soil sampling results documenting that these areas could be down posted from a Contaminated Area to a Radiologically Controlled Area.
- **Appendix J –** Appendix J contains the material and equipment survey data confirming that the 58 household appliances found within the two buildings were not radiologically impacted and could be transported for off-site disposal.
- **Appendix K –** Appendix K contains copies of the profiles, manifests, bills of lading, and weight tickets for the wastes (not including asbestos containing material [ACM]) shipped for off-site disposal.
- **Appendix L –** Appendix L contains the Buildings 1121 and 1323 Class 1 and Class 2 survey results documenting that these two buildings were not radiologically impacted.

- **Appendix M –** Appendix M contains copies of the DON's Notices to Proceed with demolition of Buildings 1121 and 1323 along with CDPH's concurrence with the survey data indicating that the two buildings were not radiologically impacted.
- **Appendix N –** Appendix N contains the final definitive data soil sample results from the soil remaining in the area of the former SWDA A&B hot spot locations.
- **Appendix O –** Appendix O contains responses to regulatory agency comments on the draft version of this report.

2.0 REMOVAL ACTIONS

This phase of NTCRA activities was performed between April 17, 2013 and December 23, 2013. Buildings 1121 and 1323 preparation, asbestos abatement, radiological survey, and demolition activities were conducted between April 17, 2013 and December 6, 2013, and the radiological hot spot removal activities were performed between May 30, 2013 and June 5, 2013. Site restoration activities were completed on December 11, 2013. Transport and disposal of the waste streams generated from the building demolition activities were completed on December 23, 2013. The following sections provide a summary of the radiological survey, removal, demolition, site restoration, and transport and disposal activities performed to meet the removal objectives of this CTO.

2.1 PRE-CONSTRUCTION ACTIVITIES

The following activities were conducted in preparation for the removal of the two radiologically elevated locations along the SWDA A&B fence line and radiological survey and demolition of Buildings 1121 and 1323:

- On April 10, 2013, One Call notifications were submitted for the two hot spot locations; monthly updates were submitted through July 2013.
- On May 1, 2013, a Treasure Island Dig Permit was submitted for the two hot spot locations.
- On May 2 and 15, 2013, a pre-existing site conditions survey was performed; photographs of the existing conditions were submitted to the DON on May 22, 2013.
- On May 6, 2013, a Builder and Contractors Application was submitted to the San Francisco Public Utilities Commission for use of a fire hydrant located at 1121 Westside Drive on May 6, 2013; approval was received on May 15, 2013.
- On May 15, 2013, Bayview (asbestos abatement subcontractor) submitted its notification for friable asbestos removal for Buildings 1121 and 1323 to the Bay Area Air Quality Management District (BAAQMD). Bayview submitted the Temporary Worksite Notification for Asbestos Related Work to the State of California Department of Industrial Relations Division of Occupational Safety and Health on May 30, 2013. Copies of the notifications and revisions are provided in Appendix C.
- On May 8, 2013, excavation notification was submitted to the State of California Division of Occupational Safety and Health.
- On May 14, 2013, the pre-construction/kick-off meeting was held with the DON.
- On May 15, 2013, Precision Locating, LLC performed geophysical surveys in the vicinity of the two locations with elevated gamma readings along the SWDA A&B fence line and Buildings 1121 and 1323.

- On May 17, 2013, 24-hour work notice fliers were hand-delivered to the nearby residents and businesses detailing the excavation and demolition activities to be performed.
- On May 20, 2013, demolition notification for Buildings 1121 and 1323 was submitted to the BAAQMD; updates in the completion date were submitted on July 8, 2013 and August 8, 2013.
- On October 28, 2013, demolition notification for Building 1323 was submitted to the BAAQMD.
- On November 27, 2013, 24-hour work notice fliers were hand-delivered to the nearby residents and businesses informing them of the demolition of Building 1323.

Copies of the permits, notifications, pre-construction/kick-off meeting minutes, and 24-hour work notice fliers are provided in Appendix D.

In addition to the pre-construction activities above, material-specific background reference areas were established for the soil hot spot removal and building radiological survey activities. Non-radiologically impacted site background reference areas with similar physical, chemical, geological, radiological, and biological characteristics as the building or site being evaluated were selected. For the hot spot removals, the reference background area and soil sample results used were those provided in the report titled Analysis of Gamma Survey and Radium-226 Soil Concentration Data at the Treasure Island Site-Wide Background Areas and the Area 7 Background Reference Area, hereinafter referred to as the Treasure Island Background Area document (Shaw 2012).

As TtEC was currently performing radiological controls at other locations at NAVSTA TI, TtEC continued to use Building 570 as the temporary site office during pre-construction and field activities.

All equipment and material used were surveyed upon arrival at NAVSTA TI, prior to use, until the equipment was verified to be clear of radioactive contamination. AEC Regulatory Guide 1.86 limits (AEC 1974) specified for Ra-226 were used for clearance of equipment and materials.

2.2 SWDA A&B HOT SPOT REMOVAL ACTIONS

The following sections describe the hot spot removal activities that were conducted to meet the removal objectives. Based on CDPH's Report (CDPH 2011) and as shown on Figure 1-2, four locations in the southern hot spot (77, 78, 82, and 83) and one location in the northern hot spot (84) required further investigation and soil removal.

2.2.1 Pre-Removal Activities

On May 30, 2013, Radiological Control Technicians (RCTs) radiologically surveyed the ground surface in the vicinity of the soil hot spots as identified in CDPH's Report (CDPH 2011) using

Ludlum Model 2350-1 data loggers with Ludlum Model 44-10 2-inch by 2-inch sodium iodide (NaI) detectors to identify the location of each hot spot. Vegetation was removed, as needed, to allow access to the locations with elevated readings. Roots were left in place so as not to disturb the soil. During the scan of hot spots 78, 82, and 83, additional locations with elevated readings were identified, which led to renaming the hot spot locations 77-01, 78-01, 78-02, 82-01, 82-02, 83-01, 83-02, 83-03, and 84-01 (Figure 2-1) based on proximity to the initial hot spot locations. Gamma readings ranged from 11,000 counts per minute (cpm) to 115,000 cpm, and dose rate measurements with a Bicron microrem meter ranged from 12 to 700 microrem per hour (microrem/hr) as compared to the corresponding background values of 5,000 to 7,000 cpm and 4 to 6 microrem/hr (Figure 2-1). Copies of the calibration certificates for the instrumentation used are provided in Appendix E.

2.2.2 Hot Spot Removals

The site conceptual model indicates that the elevated readings identified in the CDPH report are most likely the result of near-surface, gamma-emitting radioluminescent devices. To minimize personnel radiation exposures consistent with the ALARA concept, as well as minimize the generation of low-level radioactive waste (LLRW), remediation of radioactively impacted locations was performed using shovels rather than excavating the impacted soil and transporting it to a screening pad for subsequent surveys and sample collection.

During the removal process, soil samples were analyzed by Curtis & Tompkins, Ltd. (C&T), a laboratory accredited by the Department of Defense Environmental Laboratory Accreditation Program and CDPH National Environmental Laboratory Accreditation Program for gamma spectroscopy (which includes Ra-226. Swipe samples for loose contamination were also collected from soil removal equipment (e.g., shovels) and analyzed for gross alpha/gross beta using a Protean WPC 1050 gas-flow proportional gross alpha and beta radiation counter. Soil samples were first screened using the EG&G Spectroscopy System and the 186 kiloelectron-volt (keV) Ra-226 energy peak for expedited analysis. If the release criterion was exceeded, or the Ra-226 results were not similar to the reference area results for any of the soil samples, the iterative process of remediation followed by collection of post-remediation soil samples continued until the release criterion had been achieved. Once post-remediation screening samples confirmed that the release criterion for Ra-226 was achieved, and the results were similar to the reference area results, these samples were reanalyzed after a 21-day ingrowth period using the EG&G Spectroscopy System and the 609 keV bismuth-214 gamma energy peak to quantify Ra-226 results.

During removal activities, air monitoring was performed in accordance with the project plans to ensure worker and community safety. Air quality monitoring stations were placed downwind of the southern hot spot location and upwind of the northern hot spot location. Air samples were analyzed for total suspended particulates (TSP), lead, particulate matter smaller than 10 microns

in diameter (PM_{10}), asbestos, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) by SCS Engineers. All of the sample data were below the California Occupational Safety and Health Administration permissible exposure limits of 0.5 microgram per cubic meter ($\mu g/m^3$) for TSP (level chosen to minimize overall permissible dust release from the site), 0.05 milligram per cubic meter (mg/m^3) for lead, 5 mg/m^3 for PM_{10}, 0.1 fiber/cubic centimeter (cm^3) for asbestos, and 0.5 mg/m^3 for both PAHs and PCBs. Water spray was used as needed to prevent fugitive dust during excavation activities. Air sample analytical results are provided in Appendix F.

Air samples for gross alpha and beta airborne contamination concentrations were analyzed by C&T using the Protean WPC 1050 gas-flow proportional gross alpha and beta radiation counter. All of the results were significantly below 10 percent of the derived air concentration (DAC) of 3×10^{-10} microcuries per milliliter (µCi/ml) for Ra-226 for radiation workers, as well as, with one exception, the airborne effluent limit of 9×10^{-13} µCi/ml from 10 *Code of Federal Regulations* (CFR) 20 Appendix B for protection of members of the public. On March 20, 2013, one grab sample indicated a minimum detectable activity of 1.22×10^{-12} µCi/ml, resulting from the comparatively small volume of air collected. Note that this sample was collected during 30 minutes of soil removal, and the airborne effluent limit from 10 CFR 20 Appendix B is based on 1 year of continuous air emissions. Converting the airborne effluent limit from 10 CFR 20 Appendix B to adjust for a 30-minute work period results in an effluent limit of 3.6×10^{-9} µCi/ml. As such, all air sample results indicate that the general public was protected from airborne emissions. Air sample analytical results are provided in Appendix F.

All personnel participating in remediation efforts were dressed in personal protective equipment (PPE) consisting of a Tyvek® suit, gloves, and booties, and were issued personnel dosimeters to monitor their exposures while working in areas with potential radiological contamination. Before the start of the removal action at each hot spot location, plastic was placed adjacent to the area to be remediated to prevent the spread of radioactive contamination. Remediation activities began on May 30, 2013 and were completed on June 7, 2013. A total of twenty-two 5-gallon buckets of contaminated soil and one radium commodity were collected and transferred to the DON's LLRW contractor, Environmental Management Services (EMS), for disposal as LLRW. Used PPE and sampling supplies were bagged and also transferred to EMS for disposal as LLRW.

A summary of the removal activities completed to meet the removal action objectives is provided below. Note that all Ra-226 soil concentrations discussed in this report are gross values.

- On May 30, 2013, removal activities began at hot spots 82-01, 82-02, 83-01, 83-02, and 83-03. As the soil was removed with a shovel, the RCT would survey the soil using a Ludlum Model 2350-1 data logger with a Ludlum Model 44-10 2-inch by 2-inch NaI detector to qualitatively determine the source of elevated gamma readings in order to

secure the source and aid in the decision to terminate excavation operations. The estimated depth of the material with an elevated reading at each location did not exceed 3 inches. No commodities were found at locations 82-01, 82-02, 83-01, 83-02, and 83-03. The material/soil with an elevated reading from each location, not including locations 83-02 and 83-03, was placed in Ziploc® bags, marked according to their location, and placed in a 5-gallon bucket. The soil source of the elevated readings at locations 83-02 and 83-03 was placed directly into a 5-gallon bucket for disposal as LLRW. At location 82-01, the edge of the asphalt pathway was chipped to allow access to the elevated-reading material. The 5-gallon buckets were transferred to the commodity locker located within the Radioactive Materials Area (RMA) adjacent to Building 570 until transferred to EMS for disposal as LLRW. Dose rate measurements taken with a Bicron microrem meter of the excavated material ranged from 30 to 250 microrem/hr.

One post-remediation soil sample was collected from the bottom of each excavation. The screening post-remediation soil sample results for Ra-226 ranged from 0.9745 pCi/g to 21.72 pCi/g (Figure 2-1). Gamma readings of the bottom of the excavations with a Ludlum Model 2350-1 data logger and a Ludlum Model 44-10 2-inch by 2-inch NaI detector ranged from 6,815 cpm to 8,276 cpm, and dose rate measurements with a Bicron microrem meter ranged from 5 to 7 microrem/hr (Figure 2-1).

- On May 31, 2013, removal activities began at hot spots 77-01, 78-01, and 78-02. As soil was removed with a shovel, the RCT would survey the soil with a Ludlum 2350-1 data logger with a 44-10 2-inch by 2-inch NaI detector. Radioactive commodities were not recovered in these locations. Flecks of material/soil with elevated readings from locations 78-01 and 78-02 were placed in Ziploc bags. The material with elevated readings at location 77-01 was identified at the base of a shrub that had been removed to just above the ground surface the previous day. After the initial material with elevated readings was removed near the surface, additional elevated readings remained near the roots. Hand tools were used to loosen the material near the roots of the former shrub, and the remaining material with elevated readings was recovered and placed in a Ziploc bag. The bags were marked according to their location, placed in a 5-gallon bucket, and transferred to the commodity locker located within the RMA adjacent to Building 570 until transferred to EMS for disposal as LLRW. The estimated depth of the material with elevated readings at these locations did not exceed 3 inches.

  One post-remediation soil sample was collected from the bottom of each excavation. The screening post-remediation soil sample results for Ra-226 ranged from 0.6196 pCi/g to 1.127 pCi/g (Figure 2-1). Gamma readings of the bottom of the excavations with a Ludlum Model 2350-1 data logger and a Ludlum Model 44-10 2-inch by 2-inch NaI detector ranged from 6,300 cpm to 6,800 cpm, and dose rate measurements with a Bicron microrem meter ranged from 6 to 7 microrem/hr (Figure 2-1).

- On June 3, 2013, removal activities began at hot spot 84-01. A small fragment of a radioactive foil was recovered at a depth of approximately 3 inches. The foil was placed inside a Ziploc bag and transferred to a concrete-lined drum located within the commodity locker in the RMA adjacent to Building 570 until transferred to EMS for disposal as LLRW. After removal of the foil, gamma readings with a Ludlum Model 2350-1 data logger with a Ludlum Model 44-10 2-inch by 2-inch NaI detector within the

area were 15,000 cpm. Soil 1 foot on either side of the location with elevated readings was removed to a depth of 6 inches and placed in four 5-gallon buckets. Bicron microrem meter dose rate measurements of the buckets ranged from 15 to 20 microrem/hr. A large rock used to mark and shield the location during investigative scans was found to have 95 alpha cpm and 1,405 beta cpm. The four buckets and the rock were transferred to the commodity locker located within the RMA adjacent to Building 570 until transferred to EMS for disposal as LLRW.

The gamma scan readings of the excavated surfaces ranged from 6,500 cpm to 8,250 cpm, and the dose rate measurement with a Bicron microrem meter was 6 microrem/hr (Figure 2-1). Six post-remediation soil samples (two excavation bottom and four sidewall) were collected (Figure 2-2). The bottom screening soil samples indicated Ra-226 at 0.8622 pCi/g and 0.3101 pCi/g. The sidewall screening soil samples indicated Ra-226 at 0.855 pCi/g, 1.253 pCi/g, 0.5876 pCi/g, and 1.061 pCi/g (Figure 2-2).

- On June 4, 2013, remediations were performed at hot spots 83-01, 83-02, and 83-03 due to Ra-226 exceeding the release criterion as shown on Figure 2-1. The screening soil sample results indicated Ra-226 at 1.84 pCi/g, 21.72 pCi/g, and 2.193 pCi/g, respectively. Soil was removed 1 foot around each location to a depth of 6 inches resulting in a single, contiguous excavated area. Following remediation, the gamma reading measured with a Ludlum Model 2350-1 data logger with a Ludlum Model 44-10 2-inch by 2-inch NaI detector was 6,000 cpm, and dose rate measured with a Bicron microrem meter was 6 microrem/hr. The excavated soil was placed in eight 5-gallon buckets and transferred to the commodity locker located within the RMA adjacent to Building 570 until transferred to EMS for disposal as LLRW. Dose rate measurements on the buckets ranged from 5 to 6 microrem/hr with a Bicron microrem meter.

  Seven post-remediation soil samples were collected at locations where soil sample results showed elevated activity concentrations of Ra-226, as well as on the sidewalls of the excavation to ensure the elevated activity concentrations had been appropriately remediated (Figure 2-3). Three were collected from the excavation bottom at the former locations of the elevated activity, and four were collected from the sidewalls. The excavation bottom screening soil sample results indicated Ra-226 at 0.4231 pCi/g, 0.7058 pCi/g, and 0.716 pCi/g. The sidewall screening soil sample results indicated Ra-226 at 0.3481 pCi/g, 0.631 pCi/g, 0.6865 pCi/g, and 0.766 pCi/g (Figure 2-3).

- On June 5, 2013, remediations were performed at hot spots 78-02 and 82-01 (Figure 2-1) and at sidewall sample locations 84-03 and 84-05 (Figure 2-2) due to Ra-226 concentrations dissimilar to background concentrations. The screening soil sample results indicated Ra-226 at 1.127 pCi/g, 1.201 pCi/g, 1.253 pCi/g, and 1.061 pCi/g, respectively.

  At hot spot 78-02, soil was removed 1 foot around to a depth of 6 inches and placed into two 5-gallon buckets. Dose rate measured with a Bicron microrem meter was 5 microrem/hr. Five post-remediation soil samples were collected. One sample was collected from the excavation bottom and four were collected from the sidewalls (Figure 2-3). The excavation bottom screening soil sample result indicated Ra-226 at 0.8588 pCi/g. The sidewall screening soil sample results indicated Ra-226 at

0.5686 pCi/g, 0.7447 pCi/g, 0.4706 pCi/g, and 0.4513 pCi/g (Figure 2-3). Gamma readings and dose rate measurements of the excavated surfaces were 5,600 cpm and 5 microrem/hr, respectively.

At hot spot 82-01, soil was removed 1 foot around to a depth of 6 inches and placed into two 5-gallon buckets. Dose rate measured with a Bicron microrem meter was 6 microrem/hr. Three post-remediation soil samples were collected. One sample was collected from the excavation bottom and two were collected from the sidewalls (Figure 2-3). The excavation bottom screening soil sample result indicated Ra-226 at 0.5039 pCi/g. The sidewall screening soil sample results indicated Ra-226 at 0.6442 pCi/g and 0.8476 pCi/g (Figure 2-3). Gamma readings and dose rate measurements of the excavated surface were 8,600 cpm and 6 microrem/hr, respectively.

At sidewall sample location 84-03, additional soil from the sidewall was removed laterally another 6 inches, which resulted in a portion of the asphalt walkway being removed. The excavated soil and asphalt were placed into two 5-gallon buckets, and the dose rate measured 5 to 6 microrem/hr with a Bicron microrem meter. Two post-remediation soil samples (one from the excavation bottom and one from the sidewall) were collected (Figure 2-2). The excavation bottom and sidewall screening soil sample results indicated Ra-226 at 0.7654 pCi/g and 0.6493 pCi/g, respectively (Figure 2-2). Gamma readings and dose rate measurements of the excavated surfaces were 7,500 cpm and 7 microrem/hr, respectively.

At sidewall sample location 84-05, additional soil from the sidewall was removed laterally another 6 inches and placed into two 5-gallon buckets. Dose rate measured with a Bicron microrem meter was 6 microrem/hr. Two post-remediation soil samples (one from the excavation bottom and one from the sidewall) were collected (Figure 2-2). The excavation bottom and sidewall screening soil sample results indicated Ra-226 at 0.5012 pCi/g and 0.8756 pCi/g, respectively (Figure 2-2). Gamma readings and dose rate measurements of the excavated surfaces were 7,500 cpm and 7 microrem/hr, respectively.

The eight 5-gallon buckets of soil were transferred to the commodity locker located within the RMA adjacent to Building 570 until transferred to EMS for disposal as LLRW.

- Based on the screening soil sample data indicating that the radiologically impacted material/soil has been removed from each hot spot location and that the remaining soil meets the Ra-226 release criterion, the final post-remediation screening soil samples from each hot spot location were reanalyzed by C&T after a 21-day ingrowth period to confirm that all of the soil with elevated readings had been removed from the southern and northern hot spot locations. The reanalysis confirmed that all of the soil with elevated readings had been removed. Discussion of the confirmation soil sample data is provided in Section 3.1.

2.2.3 Site Restoration

- The screening soil sample data indicated that the radiologically impacted material/soil had been removed from each hot spot location, and the gamma readings of the final excavated surfaces measured with a Ludlum Model 2350-1 data logger with a Ludlum Model 44-10 2-inch by 2-inch NaI detector ranged from 5,000 to 8,000 cpm, which is

consistent with background levels shown on Figure 2-1. Therefore, site restoration was performed by backfilling the surface excavations with DON-approved import material from Hunters Point Naval Shipyard. A copy of the DON-approved import material acceptance package is provided in Appendix G.

- Following DON concurrence that the post-remediation definitive soil sampling data confirmed that the release criterion for Ra-226 had been achieved and the remaining Ra-226 concentrations were similar to background concentrations, the southern and northern hot spot locations were down posted on October 25, 2013.
- Following the final site walk-through inspection with the DON on December 11, 2013, the backfilled excavations were graded to match the existing ground surfaces. The DON's concurrence that the hot spot removal activities were completed in accordance with the CTO No. 0013 statement of work and the contract requirements was received on December 11, 2013. A copy of the DON-approved final site walk inspection form is provided in Appendix H.

2.3 RADIOLOGICAL SURVEY AND DEMOLITION OF BUILDINGS 1121 AND 1323

The following sections describe the Building 1121 and 1323 field activities that were conducted to meet the removal objectives.

2.3.1 Pre-Demolition Activities

- As the area around Building 1121 and the laydown area, Lester Court, had not yet been radiologically cleared by the DON, TtEC performed additional characterization surveys and soil sampling of the area around Building 1121 and characterization surveys at Lester Court to determine Radiation Work Permit requirements. The surveys and soil sampling were performed in the vicinity of Building 1121 between April 17, 2013 and May 2, 2013. The surveys of Lester Court were performed between June 6, 2013 and June 10, 2013. The survey results indicated that these areas would be managed as Radiologically Controlled Areas and were posted accordingly. Copies of the characterization surveys and soil sampling results are provided in Appendix I.
- On May 7, 2013, Bayview performed an asbestos survey of the two buildings to confirm that all of the ACM had been documented in the DON's June 1998 asbestos survey reports. Bayview's subcontractor, Stockton Environmental, identified additional ACM during their survey of the buildings. The black roof mastics associated with the roof penetrations for both buildings were confirmed to be ACM (29 in Building 1121 and 30 in Building 1323). The sheetrock joint compound in Building 1323 was also confirmed to contain asbestos, resulting in an additional 40,100 square feet of ACM requiring abatement and disposal. A copy of Stockton Environmental's report is provided in Appendix C.
- On May 16, 2013, TtEC performed inspections of Buildings 1121 and 1323 to determine if there were any health and safety concerns that would need to be addressed in preparation for the asbestos abatement activities. Medical and biological wastes were encountered. As these waste streams had not been encountered during the site walk of Unit F of Building 1323, unsanitary conditions had not been anticipated. The removal of the medical and

biological wastes was performed between May 17, 2013 and May 22, 2013, with the waste streams being transferred to the San Francisco Police Department.

- Prior to asbestos abatement activities, the household appliances present in each of the buildings were removed and staged in an adjacent carport where material and equipment surveys were performed to confirm that the appliances were not radiologically impacted. Copies of the survey data are provided in Appendix J. On September 20, 2013, 58 household appliances removed from Buildings 1121 and 1323 (29 per building) were transported by Eighteen Trucking to Recology Hay Road Landfill for disposal. Copies of the manifests, bills of lading, and weight tickets are provided in Appendix K.
- Bayview performed the asbestos abatement in Building 1121 between May 30, 2013 and June 11, 2013 and performed the first phase of asbestos abatement in Building 1323 between June 10, 2013 and June 24, 2013. Air monitoring for potential alpha and beta airborne contamination was conducted during abatement activities. The materials generated from the roof penetrations were removed from Building 1121 on July 3, 2013 and July 11, 2013. The second phase of the abatement activities in Building 1323 (the removal of the roof penetrations and sheetrock with asbestos-containing joint compound) was performed between October 29, 2013 and November 20, 2013 after receipt of the DON's concurrence on October 29, 2013, that the survey data indicated that the building had not been radiologically impacted. A total of 20 cubic yards of hazardous asbestos waste from Building 1121 was transferred to Building 96 on September 26, 2013 until transported by World Environmental and Energy to Recology Hay Road Landfill located in Vacaville, California, for disposal on September 30, 2013. A total of 30 cubic yards of hazardous asbestos waste and 200 cubic yards of nonhazardous asbestos waste from Building 1323 were transported by World Environmental and Energy to Recology Hay Road Landfill for disposal on November 26, 2013. Two 55-gallon drums of asbestos mastic were transported by Bayview and KM Industrial, Inc. to Crosby and Overton, Inc. located in Long Beach, California, for disposal on December 17, 2013. Copies of the manifests are provided in Appendix C.
- As prior radiation surveys and sample analysis identified Ra-226 impacted debris and soil in some of the SWDAs within IR Site 12, radiological surveys of the interiors and exteriors of Buildings 1121 and 1323 were performed to confirm that radiologically impacted soil had not been tracked into the buildings and the wind had not deposited radiologically impacted soil onto the exterior surfaces prior to demolition of the buildings. This was to ensure that radiologically contaminated debris would not end up in a California landfill. In Building 1121, the first floor and up 2 meters of the wall and stairwells underwent a Class 1 survey, and the exterior wall up 2 meters from the building foundation underwent a Class 2 survey. In Building 1323, the base of the wall to 2 meters up the wall on the first floor and stairwells underwent a Class 1 survey, and the exterior wall up 2 meters from the building foundation underwent a Class 2 survey. A survey of the floor was not completed in Building 1323 as the floor was not to be removed for disposal.

  A total of six Class 1 survey units and one Class 2 survey unit were established for each of the buildings. Each Class 1 and Class 2 survey unit underwent 100 percent gamma and alpha scans using a Ludlum 2350-1 data logger with a Ludlum 44-10 2-inch by

2-inch NaI detector. A minimum of 20 systematic swipe samples, static alpha and gamma measurements, and exposure rate measurements were collected in each survey unit. Additional measurements and samples were collected if investigation levels were exceeded. Layouts of each of the survey units including a summary of the scan data, swipe samples, and measurements are provided in Appendix L. The results of the survey confirmed that the buildings had not been radiologically impacted. The survey results were below the release criteria of 20 dpm/100 cm^2 alpha or 1,000 dpm/100 cm^2 beta removal contamination, or 100 dpm/100 cm^2 alpha or 5,000 dpm/100 cm^2 beta fixed contamination.

The radiological surveys at Building 1121 were performed between June 28, 2013 and July 30, 2013; and at Building 1323, between July 18, 2013 and July 31, 2013 and August 22, 2013 and October 3, 2013. CDPH performed confirmatory surveys of Building 1121 on July 24, 2013, and of Building 1323 on September 20, 2013 and September 27, 2013. TtEC received the DON's Notice to Proceed with demolition of Building 1121 along with CDPH's concurrence that Building 1121 was not radiologically impacted on September 6, 2013. TtEC received CDPH's concurrence that Building 1323 was not radiologically impacted and the DON's Notice to Proceed with demolition of Building 1323 on November 12, 2013 and November 22, 2013, respectively. Copies of the concurrence on the survey data and Notices to Proceed are provided in Appendix M.

- In addition to the survey of the buildings to ensure they were not radiologically impacted prior to demolition, the six wood storage sheds associated with Building 1121 and the wood panels from the privacy fence associated with Building 1323 also underwent material and equipment surveys to ensure that these items were not radiologically impacted prior to shipment for off-site disposal with the building demolition debris. Copies of the survey data are provided in Appendix J.

2.3.2 Building Demolition

Following receipt of the Notice to Proceed with demolition of the buildings, the demolition, debris downsizing, and waste transport and disposal activities commenced. During demolition activities, air monitoring was performed in accordance with the project plans to ensure worker and community safety. Upwind and downwind air quality monitoring stations were placed at each building, and air samples were analyzed for TSP, lead, PM_{10}, and asbestos by SCS Engineers. All of the sample data were below 0.5 mg/m^3 for TSP, 0.05 mg/m^3 for lead, 5 mg/m^3 for PM_{10}, and 0.1 fiber/cm^3 for asbestos. Water spray was used as needed to prevent fugitive dust during demolition, debris downsizing, and waste load-out activities. Waste off-hauling was performed between 9:00 am and 2:30 pm to minimize disruptions to residents and NAVSTA TI traffic.

- Building 1121 demolition was completed on September 9, 2013. Downsizing and off-haul of the demolition debris were performed between September 9, 2013 and September 13, 2013. A total of 161.61 tons of nonhazardous building demolition debris was transported by Eighteen Trucking and C&K Trucking to Recology Hay Road Landfill for disposal between September 10, 2013 and September 13, 2013. A total of 14.76 tons of building demolition debris with lead paint was transported by Sanchez Transport, Inc. to

Clean Harbors Buttonwillow Landfill located in Buttonwillow, California for disposal on December 9, 2013.

- Building 1323 demolition was completed on December 2 and 3, 2013. Downsizing and off-haul of the demolition debris were performed between December 2, 2013 and December 6, 2013. A total of 144.32 tons of nonhazardous building demolition debris was transported by C&K Trucking, J&G Trucking, and H&J Trucking to Recology Hay Road Landfill for disposal between December 4, 2013 and December 6, 2013.
- Prior to the demolition of both Buildings 1121 and 1323, mercury thermostats were removed, containerized in one 5-gallon bucket, and secured. This universal waste was transported by Eighteen Trucking to Clean Harbors San Jose LLC located in San Jose, California, on December 23, 2013.

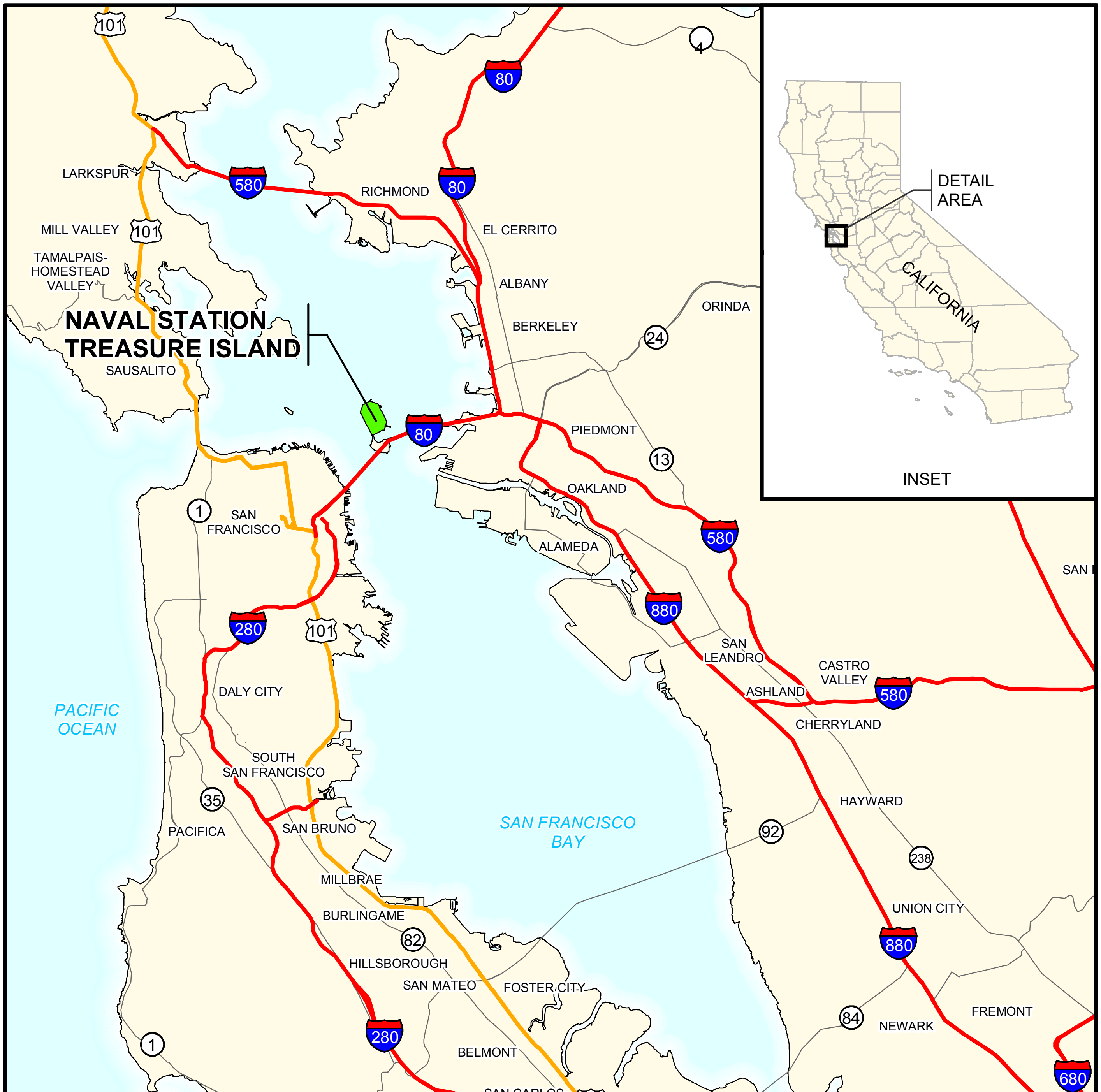
Copies of the waste profiles, manifests, bills of lading, and weight tickets for the waste streams generated from the demolition of Buildings 1121 and 1323 are provided in Appendix K. Used PPE was bagged and disposed of with the demolition debris.

2.3.3 Site Restoration

Following removal of the demolition debris, each of the sites underwent restoration before being turned over to the DON.

- Site restoration at Building 1121 involved demobilizing equipment and materials from the site. A final site walk-through inspection with the DON was held on September 16, 2013. After completing the one punchlist item of replacing sod in the green belt area across from Lester Court, DON concurrence that the Building 1121 removal activities were completed in accordance with the CTO No. 0013 statement of work and the contract requirements was received on September 20, 2013.
- Site restoration at Building 1323 involved demobilizing equipment and materials from the site. A final site walk-through inspection with the DON was held on December 11, 2013. After completing the punchlist items of cutting rebar penetrating from the concrete slab foundation, spray painting the remaining rebar stub and other tripping hazards with high visibility paint, and removing a piece of vinyl flooring from the ground surface, DON concurrence that the Building 1323 removal activities were completed in accordance with the CTO No. 0013 statement of work and the contract requirements was received on December 11, 2013.

Copies of the DON-approved final site walk inspection forms are provided in Appendix H.



LEGEND

- 1 STATE HIGHWAY
- 101 US HIGHWAY
- 280 INTERSTATE HIGHWAY
- NAVAL STATION TREASURE ISLAND
- WATER

2.5 0 2.5 5 Miles

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

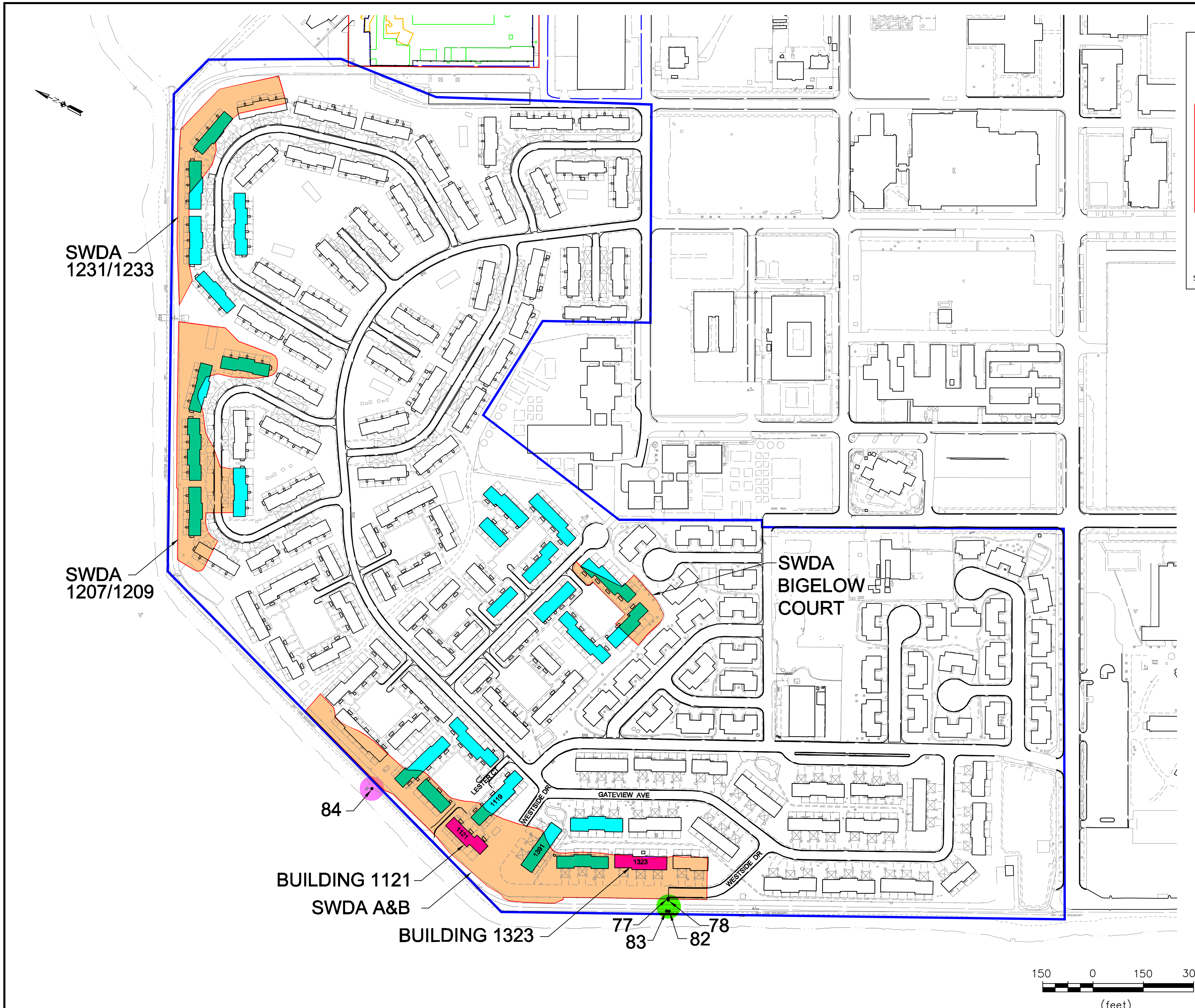
POST CONSTRUCTION SUMMARY REPORT
INSTALLATION RESTORATION SITE 12

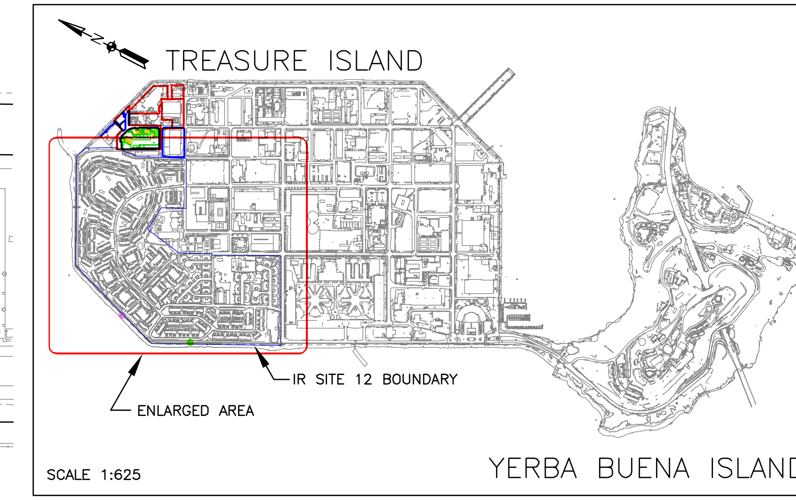
FIGURE 1-1
REGIONAL LOCATION MAP
NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: MS
FILE NUMBER: R7791.mxd

TETRA TECH EC, INC.

File Path (IRVSRVR) : P:\GIS\Projects\SanDiego\TreasureIsland\IRSite12\ArcGIS\R7791.mxd





LEGEND:

IR SITE 12 BOUNDARY

SOLID WASTE DISPOSAL AREAS (SWDAs)

• 77 AREAS OF ELEVATED ACTIVITY

BUILDINGS DEMOLISHED

BUILDINGS

UNOCCUPIED BUILDINGS

NORTHERN HOT SPOT (INCLUDES SAMPLE ID 84)

SOUTHERN HOT SPOT (INCLUDES SAMPLE IDS 77, 78, 82, AND 83)

CDPH Elevated Activity Data

Sample ID	Longitude	Latitude	Exposure Rate one meter (μR/hr)	Exposure Rate contact (μR/hr)	Dose Rate one meter (μrem/hr)	Dose Rate contact (μrem/hr)	Gamma Count Rate contact (cpm)
77	-122.3780747	37.82557866	8	800	4	500	349224
78	-122.3780826	37.82557246	8	11	4	13	53735
82	-122.3781783	37.825522	6.5	90	4	80	155981
83	-122.3781904	37.82554082	6	28	5	10	24428
84	-122.378509	37.8281435	12.5	600	5	450	880097

Source: CDPH 2011

NOTE:
AREAS OF ELEVATED ACTIVITY (77, 78, 82, 83, AND 84) BASED ON CALIFORNIA DEPARTMENT OF PUBLIC HEALTH SURVEY PERFORMED IN APRIL 2011 (TREASURE ISLAND, SITE 12 GAMMA SURVEY REPORT, SURVEY DATES: APRIL 5–7, 2011 DATED SEPTEMBER 23, 2011).

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

POST CONSTRUCTION SUMMARY REPORT
INSTALLATION RESTORATION SITE 12

FIGURE 1-2

SITE LOCATION MAP
NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CA

REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

TETRA TECH EC, INC.

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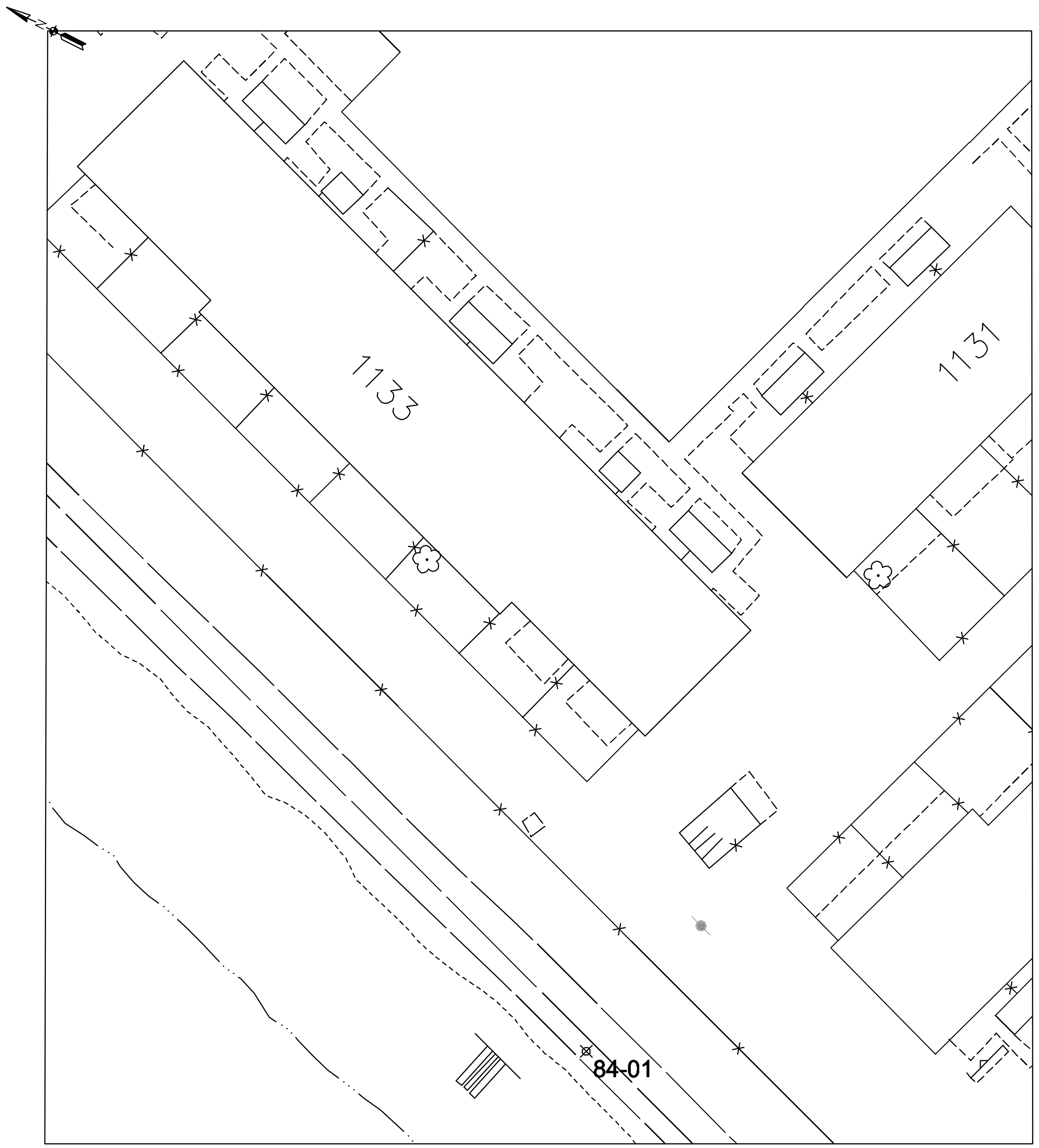
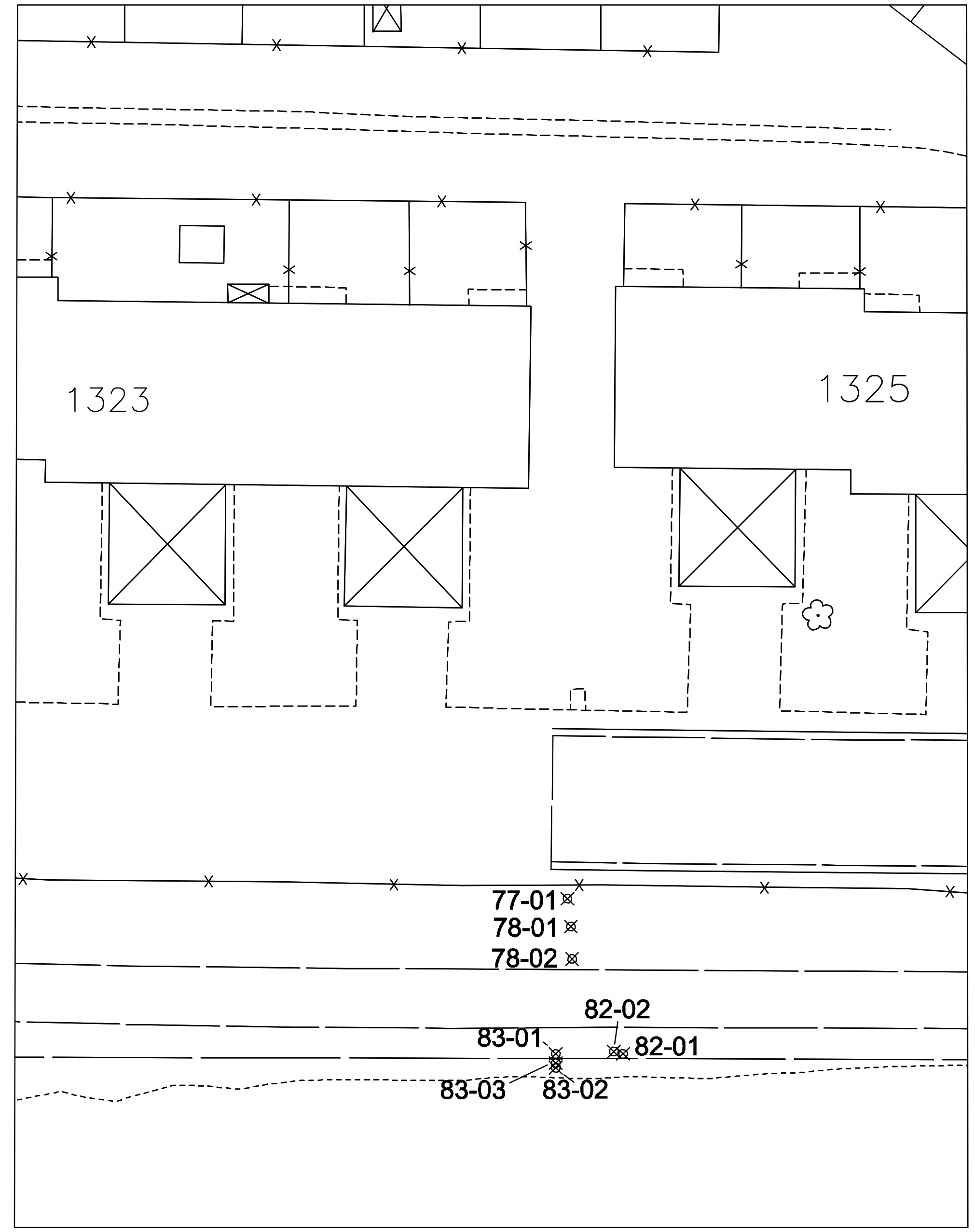
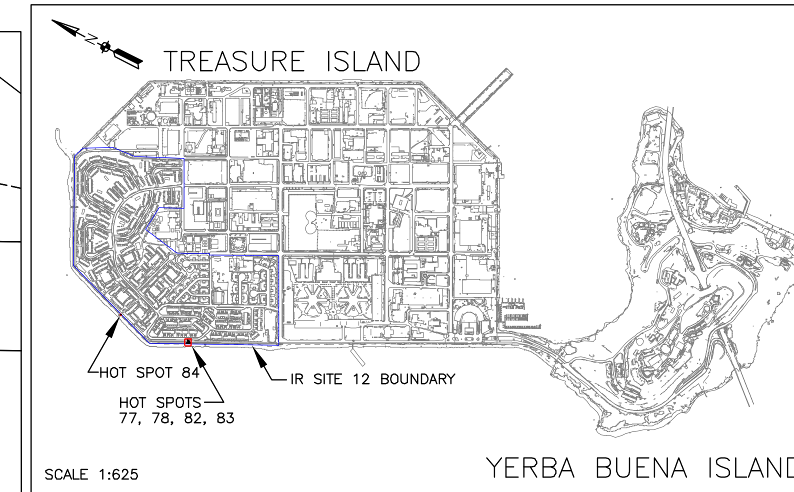
2/5/14







LEGEND:

77-01 SAMPLE POINT LOCATIONS

BUILDINGS

20 0 20 40
(feet)

Location	Dose Rate at Ground Surface[1/] (microrem/hr)	Gamma Rate at Ground Surface[1/] (cpm)	Gamma Rate at Bottom of Excavation[2/] (cpm)	Dose Rate at Bottom of Excavation[2/] (microrem/hr)	Dose Rate of Excavated Material (microrem/hr)	Post-Remediation Soil Screening Results (pCi/g)
Background	4-6	5,000-7,000	5,000-7,000	4-6	4-6	0.7
77-01	60	69,000	6,400	6	1,000	0.6196
78-01	20	15,400	6,300	6	140	0.9254
78-02	30	41,300	6,800	7	50	1.127
82-01	50	17,900	7,126	5	150	1.201
82-02	12	11,000	7,583	7	30	0.9745
83-01	200	115,000	8,276	7	250	1.84
83-02	17	15,700	7,483	7	not analyzed	21.72
83-03	15	15,100	6,815	7	not analyzed	2.193
84-01[3/]	700	109,000	8,250	6	4,000	0.8622

[1/] Prior to removal of elevated soil identified in CDPH's Report (CDPH 2011).
[2/] After removal of elevated soil identified in CDPH's Report (CDPH 2011).
[3/] A commodity was only found at location 84-01. The remaining locations contained elevated soil. Only maximum measurements after removal are presented.

Abbreviations and Acronyms:
cpm - counts per minute
hr - hour
pCi/g - picocuries per gram

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BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

POST CONSTRUCTION SUMMARY REPORT
INSTALLATION RESTORATION SITE 12

FIGURE 2-1

PRE- AND POST-INITIAL HOT SPOT REMOVAL

NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CA

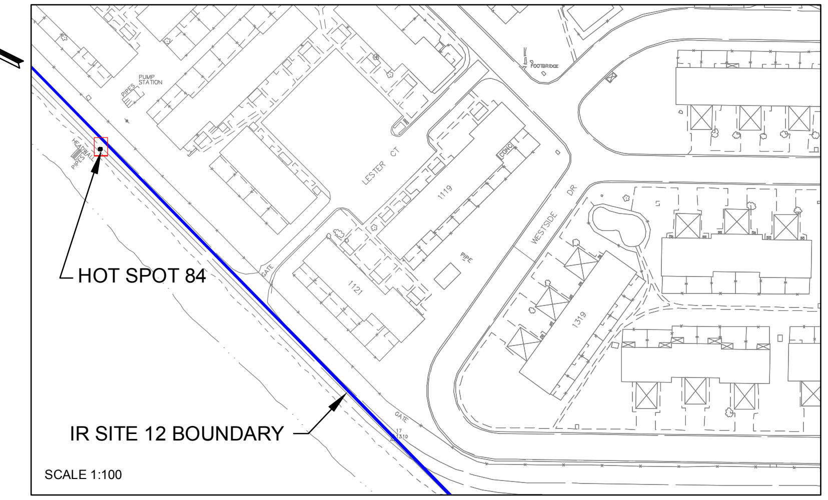
REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

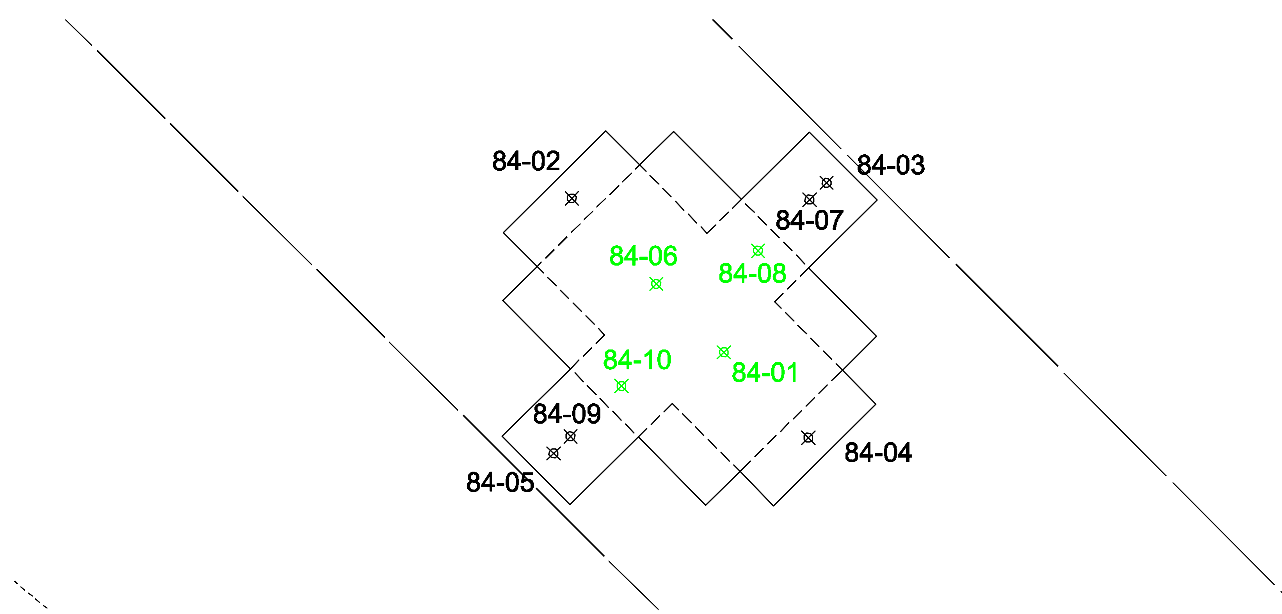
TETRA TECH EC, INC.

Sample ID	Excavation Bottom or Sidewall Soil Sample	Screening Soil Ra-226 Results (pCi/g)	Definitive Soil Ra-226 Results (pCi/g)	Soil Removed (cu ft)	Notes
13-IR12-E-HS84-01	Excavation Bottom	0.8622	0.629	3	Sample after removal of elevated material[1/]; final post-remediation sample
13-IR12-E-HS84-02	Sidewall	0.855	0.619		Final post-remediation sample
13-IR12-E-HS84-03	Sidewall	1.253	N/A		Initial post-remediation sample
13-IR12-E-HS84-04	Sidewall	0.5876	0.596		Final post-remediation sample
13-IR12-E-HS84-05	Sidewall	1.061	N/A		Initial post-remediation sample
13-IR12-E-HS84-06	Excavation Bottom	0.3101	0.479		Final post-remediation sample
13-IR12-E-HS84-07	Sidewall	0.6493	0.585	1.5	Final post-remediation sample
13-IR12-E-HS84-08	Excavation Bottom	0.7654	0.413		Final post-remediation sample
13-IR12-E-HS84-09	Sidewall	0.8756	0.506	1	Final post-remediation sample
13-IR12-E-HS84-10	Excavation Bottom	0.5012	0.547		Final post-remediation sample

[1/] Elevated soil locations identified in CDPH's Report (CDPH 2011).

The locations of the highlighted samples have been remediated and are not part of the final soil sample definitive sample data results.





HOT SPOT 84
3' X 2.5' X 0.5'

SAMPLE COLLECTION LOCATIONS (#84–01 THROUGH #84–10)

1 0 1 2
(feet)

LEGEND:

82-01 SIDEWALL POST–REMEDIATION SOIL SAMPLE

77-01 EXCAVATION BOTTOM POST–REMEDIATION SOIL SAMPLE

BUILDINGS

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BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

POST CONSTRUCTION SUMMARY REPORT
INSTALLATION RESTORATION SITE 12

FIGURE 2-2

NORTHERN HOT SPOT REMOVAL LOCATION

NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CA

REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

TETRA TECH EC, INC.

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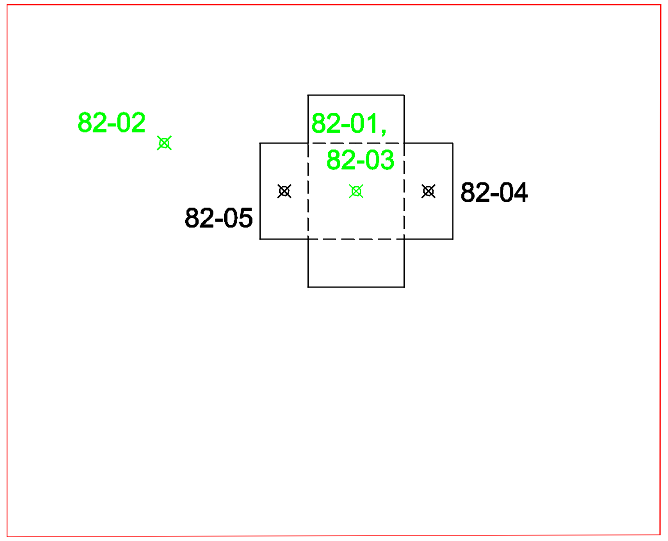
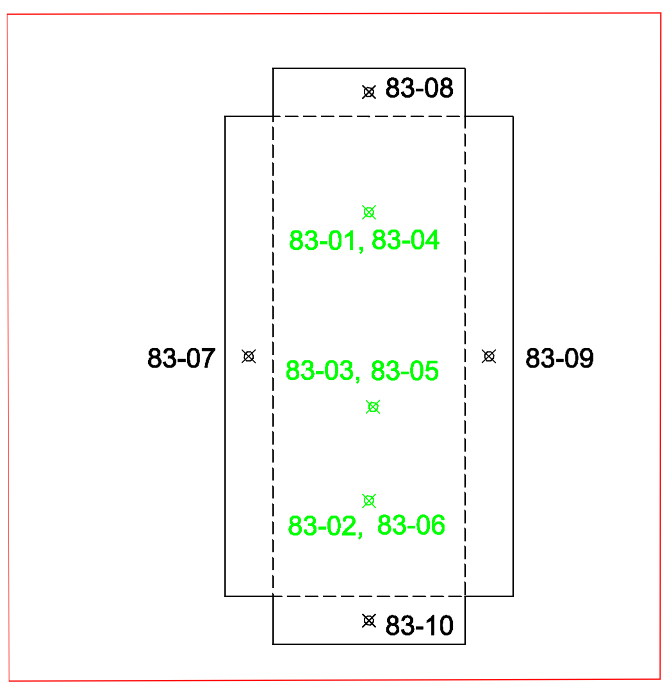
2/13/14

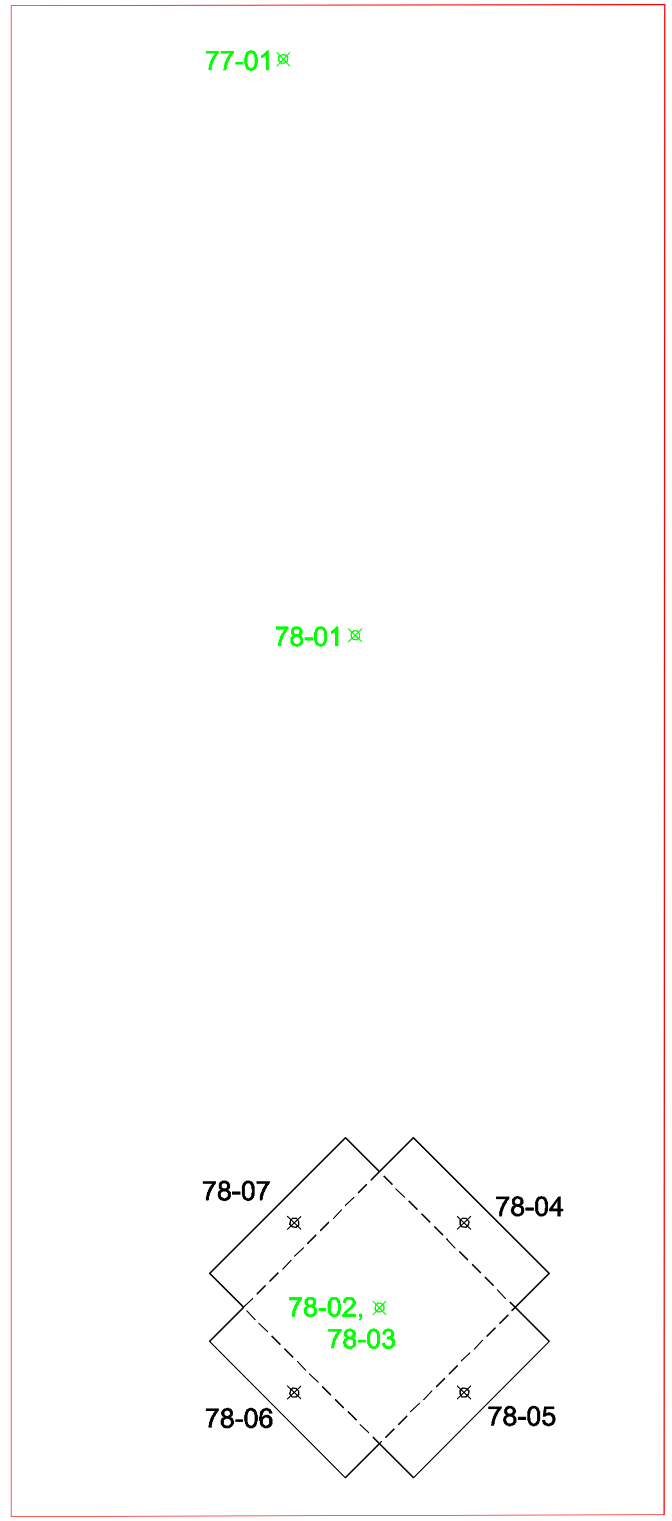
RECORD COPY



HOT SPOT 82
1' BY 1' BY 0.5'



HOT SPOT 83
5' X 2' X 0.5'



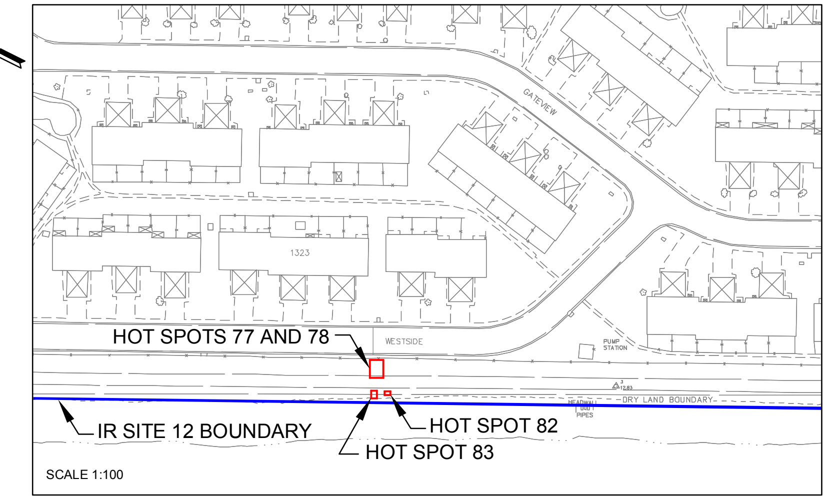
HOT SPOTS 77 AND 78
2' X 2' X 0.5'

LEGEND:

82-01 SIDEWALL POST–REMEDIATION SOIL SAMPLE

77-01 EXCAVATION BOTTOM POST–REMEDIATION SOIL SAMPLE

BUILDINGS



Sample ID	Excavation Bottom or Sidewall Soil Sample	Screening Soil Ra-226 Results (pCi/g)	Definitive Soil Ra-226 Results (pCi/g)	Soil Removed (cu ft)	Notes
13-IR12-E-HS77-01	Excavation Bottom	0.6196	0.705	1	Sample after removal of elevated material[1/]; final post-remediation sample
13-IR12-E-HS78-01	Excavation Bottom	0.9254	1.17	0.5	Sample after removal of elevated material[1/]; final post-remediation sample
13-IR12-E-HS78-02	Excavation Bottom	1.127	N/A	0.5	Sample after removal of elevated material[1/]
13-IR12-E-HS78-03	Excavation Bottom	0.8588	0.307		Final post-remediation sample
13-IR12-E-HS78-04	Sidewall	0.5686	0.336		Final post-remediation sample
13-IR12-E-HS78-05	Sidewall	0.7447	0.353	1.5	Final post-remediation sample
13-IR12-E-HS78-06	Sidewall	0.4706	0.280		Final post-remediation sample
13-IR12-E-HS78-07	Sidewall	0.4513	0.342		Final post-remediation sample
13-IR12-E-HS82-01	Excavation Bottom	1.201	N/A	<1	Sample after removal of elevated material[1/]
13-IR12-E-HS82-03	Excavation Bottom	0.5039	0.582		Final post-remediation sample
13-IR12-E-HS82-04	Sidewall	0.6442	0.677	1	Final post-remediation sample
13-IR12-E-HS82-05	Sidewall	0.8476	0.496		Final post-remediation sample
13-IR12-E-HS82-02	Excavation Bottom	0.9745	0.914	<1	Sample after removal of elevated material[1/]; final post-remediation sample
13-IR12-E-HS83-01	Excavation Bottom	1.84	N/A	<1	Sample after removal of elevated material[1/]
13-IR12-E-HS83-02	Excavation Bottom	21.72	N/A	<1	Sample after removal of elevated material[1/]
13-IR12-E-HS83-03	Excavation Bottom	2.193	N/A	<1	Sample after removal of elevated material[1/]
13-IR12-E-HS83-04	Excavation Bottom	0.4231	0.502		Final post-remediation sample
13-IR12-E-HS83-05	Excavation Bottom	0.7058	0.417		Final post-remediation sample
13-IR12-E-HS83-06	Excavation Bottom	0.716	0.447		Final post-remediation sample
13-IR12-E-HS83-07	Sidewall	0.3481	0.414	5.5	Final post-remediation sample
13-IR12-E-HS83-08	Sidewall	0.631	0.675		Final post-remediation sample
13-IR12-E-HS83-09	Sidewall	0.6865	0.480		Final post-remediation sample
13-IR12-E-HS83-10	Sidewall	0.766	0.725		Final post-remediation sample

[1/] Elevated soil locations identified in CDPH's Report (CDPH 2011).

The locations of the highlighted samples have been remediated and are not part of the final soil sample definitive sample data results.

SAMPLE COLLECTION LOCATIONS (#77–01, #78–01 THROUGH #78–07, #82–01 THROUGH #82–05, #83–01 THROUGH #83–10)

1 0 1 2
(feet)

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

POST CONSTRUCTION SUMMARY REPORT
INSTALLATION RESTORATION SITE 12

FIGURE 2-3

SOUTHERN HOT SPOT REMOVAL LOCATION

NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CA

REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

TETRA TECH EC, INC.

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2/5/14

TETRA TECH EC, INC.
ENVIRONMENTAL MULTIPLE AWARD CONTRACT (RAD EMAC)
CONTRACT NO. N62473-10-D-0809

FIELD CHANGE REQUEST (FCR)

TASK ORDER # CTO-013		FCR # 2013-CTO13-001	DATE 6/27/2013
LOCATION: Naval Station Treasure Island		ROICC / RPM	Gary Munekawa / Anthony Konzen

1. Document to be changed. Identify revision, date, section, drawing, etc.
AHAs #4 and #7 provided in Appendix A to the Final Accident Prevention Plan/Site Safety and Health Plan dated December 2012.

2. Description of existing requirement and proposed change (Attach sheet if necessary)
This FCR adds the use of elevated work platforms (EWPs) and rough terrain telehandlers for use at Buildings 1121 and 1323 to AHAs #4 and #7, respectively. See attached AHAs #04A and #07A.

3. Reason for Change (Attach sheet if necessary)
EWPs may be needed to perform the radiological survey of the exterior surface of Building 1121 as this area has not been backfilled yet and for removing the roof penetrations from Buildings 1121 and 1323. Rough terrain telehandler may be required to move equipment and materials while on site.

4. Originator: (print name and sign) Shanti Montgomery	**Title** Assistant Project Manager	**Date** 06/27/13
Reviewed by: (print name and sign) Bill Dougherty	**Title** Project Manager	**Date** 6-27-13

Site Superintendent (Print name and sign) Dennis McWade — Chris Hamlin for D. McWade	**Date** 06.27.13	**Construction Manager (Print name and sign)** Jeff Bray	**Date** 6/27/13
Program QC Manager (Print Name and Sign) Greg Joyce — for G. Joyce	**Date** 6/27/13	**ROICC Acknowledgement (Print name and sign)** Gary Munekawa	**Date** 6/27/2013
Project Environmental Safety Manager (Print Name and Sign) Roger Margotto	**Date** 6/27/13		

TETRA TECH EC, INC.
ENVIRONMENTAL MULTIPLE AWARD CONTRACT (RAD EMAC)
CONTRACT NO. N62473-10-D-0809

FIELD CHANGE REQUEST (FCR)

TASK ORDER # CTO-013	FCR # 2013-CTO13-002	DATE 5/14/2013
LOCATION: Naval Station Treasure Island	ROICC / RPM	Gary Munekawa / Anthony Konzen

1. Document to be changed. Identify revision, date, section, drawing, etc.
FINAL WASTE MANAGEMENT PLAN; NON-TIME CRITICAL REMOVAL ACTION FOR SOLID WASTE DISPOSAL AREA RADIOLOGICAL HOT SPOT REMOVAL AND BUILDING DEMOLITION AT INSTALLATION RESTORATION SITE 12, NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CALIFORNIA DATE APRIL 2013. THIS WASTE MANAGEMENT PLAN IS PROVIDED AS ATTACHMENT 5 TO THE FINAL NON-TIME CRITICAL REMOVAL ACTION WORK PLAN FOR IR SITE 12 HOT SPOTS AND BUILDINGS 1121 AND 1323 DATED APRIL 2013.

2. Description of existing requirement and proposed change (Attach sheet if necessary)
This FCR adds management requirements for universal waste fluorescent lamps and mercury thermostats as well as PCB ballasts that will be removed prior to building demolition to the Waste Management Plan. See attached text revisions.

3. Reason for Change (Attach sheet if necessary)
Final Waste Management Plan did not address universal waste or PCB ballasts, which are now known to be present in buildings to be demolished.

4. Originator: (print name and sign)		**Title**	**Date**
Jennifer Peters		Compliance Manager	05/14/13
Reviewed by: (print name and sign)		**Title**	**Date**
Bill Dougherty		Project Manager	
Site Superintendent (Print name and sign)	**Date**	**Construction Manager (Print name and sign)**	**Date**
Dennis McWade	5/15/13	Jeff Bray	5/15/13
Program QC Manager (Print Name and Sign)	**Date**	**ROICC Acknowledgement (Print name and sign)**	**Date**
Greg Joyce	5.15.13	Gary Munekawa	16 May 2013

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-10-D-0809
CTO NO. 0013

FINAL

RADIOLOGICAL INVESTIGATION AND SOURCE REMOVAL ON MARCH 20 AND 21, 2013

February 2014

DCN: RMAC-0809-0013-0010

INSTALLATION RESTORATION SITE 12
FORMER NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-10-D-0809
CTO NO. 0013

FINAL

RADIOLOGICAL INVESTIGATION AND SOURCE REMOVAL ON MARCH 20 AND 21, 2013

February 2014

INSTALLATION RESTORATION SITE 12
FORMER NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

DCN: RMAC-0809-0013-0010

Prepared by:

TETRA TECH EC, INC.
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Radiation Safety Officer

Bill Dougherty
Bill Dougherty
Project Manager

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APPENDICES

1.0 INTRODUCTION

The U.S. Department of the Navy (DON) directed Tetra Tech EC, Inc. (TtEC) to perform a radiological investigation at former Naval Station Treasure Island (NAVSTA TI) on March 19, 2013. The purpose of the investigation was to verify the presence of elevated radioactivity concentrations identified by the California Department of Public Health – Radiologic Health Branch (CDPH-RHB) during public health screening activities and mitigate any potential radiological hazards to protect the public health and welfare, and the environment. The NAVSTA TI investigation and mitigation activities were performed under Contract No. N62473-10-D-0809 and Contract Task Order 0013. The radiological work activities were performed in compliance with TtEC's California Department of Public Health Radioactive Material License No. 7909-01.

1.1 BACKGROUND

Located in San Francisco Bay (Bay) to the east of the City of San Francisco, California, NAVSTA TI comprises two contiguous islands. Bisected by the San Francisco Bay Bridge, Treasure Island on the north is approximately 403 acres in size and Yerba Buena Island to the south is about 147 acres in size. Treasure Island is manmade and constructed of materials dredged from the Bay. Prior to the construction of Treasure Island, military activities in the area date back to 1866 when the U.S. government took possession of Yerba Buena Island for defensive fortifications. In 1993, NAVSTA TI was designated for closure under the Base Closure and Realignment Act of 1990 and was finally closed on September 30, 1997. The property is currently undergoing the transfer process.

Installation Restoration (IR) Site 12 is located on a relatively flat 93-acre area within the northwest portion of NAVSTA TI. IR Site 12 consists of multiplex housing units with private backyards and common area front yards, side yards, and surrounding greenbelts. Originally, this area was used as a parking lot during the 1939–1940 Golden Gate International Exposition. Following occupation of the NAVSTA TI by the DON in 1940, the area was developed for bunker storage of munitions and other materials, vehicle equipment and storage, recreational playing fields, and disposal or burning of solid waste. Beginning in the 1960s, areas of IR Site 12 were incrementally developed into housing units for DON personnel and their dependents.

1.2 CDPH-RHB HEALTH AND SAFETY SURVEYS

At the request of the Treasure Island Development Authority (TIDA), CDPH-RHB conducted walk-over radiological surveys in the occupied housing area of IR Site 12 at NAVSTA TI from approximately March 11 through March 22, 2013. Representatives from CDPH-RHB performed these surveys using a Ludlum Model 19 MicroR survey meter. The initial survey results identified five distinct locations within IR Site 12 with exposure rates that exceeded the

background exposure rate of 4 to 6 microroentgens per hour (µR/hour) at a height of approximately 3 feet above ground surface. These areas were identified as Locations 1303A and 1303B situated to the west of Building 1303, Locations 1306C and 1306D situated to the south of Building 1306, and Location 1128E situated to the east of Building 1128. The elevated exposure rates ranged from 17 µR/hour at Location 1303B to 4,200 µR/hour at Location 1128E. Using an in situ gamma spectroscopy Inspector 1000 instrument, CDPH-RHB determined that the areas of elevated activity were due to the presence of radium-226 (Ra-226). Each of these locations within IR Site 12 and the associated exposure rate measurements are provided on Figure 1-1.

1.3 RESPONSE ACTION

The DON convened a teleconference with representatives from the Radiological Affairs Support Office, CDPH-RHB, and TtEC on March 19, 2013 to determine the best course of action to address the five suspect areas of elevated activity in IR Site 12. At the conclusion of the teleconference, the DON directed TtEC to meet with CDPH-RHB representatives at NAVSTA TI and confirm their findings, perform radiological screening, and coordinate with CDPH-RHB in the collection of split soil samples. In addition, the DON directed TtEC to implement the measures necessary to mitigate potential radiological hazards to protect the public health and welfare, and the environment. The mitigation measures included limited soil excavation in those areas of confirmed elevated radioactivity to ensure that residual radiation concentrations were indistinguishable from background concentrations following backfill and site restoration. If source removal was unsuccessful, TtEC was directed to perform other mitigation measures including the placement of a steel plate over the area and/or installing temporary fencing to limit public access until further direction from the DON was obtained.

1.4 METHODOLOGY

TtEC prepared a Radiation Work Permit (RWP) for the anticipated radiological investigation and removal activities prior to mobilizing to the field. The RWP specified the radiological controls to be used during the investigation and removal activities. A copy of the RWP is provided in Appendix A.

TtEC's methodology for performing the radiological investigation and removal activities included the mobilization of radiologically trained workers who were thoroughly briefed on the requirements of the RWP. Only calibrated instruments were utilized, and a response check was performed at the beginning of each day prior to use. The instrument calibration certificates are provided in Appendix B. In addition, tools and equipment were procured including new shovels, trowels, buckets, and drums to eliminate the possibility of cross-contamination. The tools and equipment were decontaminated prior to being used at each of the suspect sites.

Prior to beginning intrusive activities, plastic sheeting was placed around the suspect areas to limit the spread of potential contamination. In addition, radiological air samples were collected using a low-volume air sampler at a rate of one sample per day in the vicinity of the intrusive activities. The air monitoring samples were subsequently submitted to the Curtis and Tompkins on-site laboratory located at Hunters Point Naval Shipyard (HPNS) in San Francisco, California for analysis. None of the air monitoring sample results exceeded 10 percent of the derived air concentration for Ra-226. The air monitoring sample analytical results are provided in Appendix C.

1.4.1 Soil Sample Collection Methodology

Soil samples were collected using a hand trowel or core sampler between ground surface and a depth of 6 inches below ground surface (bgs) at each of the five suspect locations. The collected sample materials were subsequently split between CDPH-RHB personnel and TtEC for submittal to separate laboratories for gamma spectroscopy analysis. The TtEC split samples were submitted under chain of custody to the HPNS laboratory for analysis. The chain-of-custody documentation is provided in Appendix D.

Typically, soil samples analyzed for Ra-226 using gamma spectroscopy must achieve secular equilibrium with its progeny (21-day ingrowth), including bismuth-214 and lead-214 to obtain definitive quantitative results. However, pending receipt of the 21-day ingrowth quantitative results, a conservative estimate of Ra-226 concentrations can be made using direct analysis of the 186.2 kiloelectron-volt (keV) gamma energy peaks. The soil sample analytical results provided in this report and summarized in Appendix E are reported using the 186.2 keV gamma energy peak.

Soil samples were collected from each of the five suspect locations with elevated activities. In addition to the near-surface soil samples split with CDPH-RHB, a soil sample was collected from the excavation bottoms at Locations 1128E, 1303A, 1303B, and 1306C and submitted to the HPNS laboratory for gamma spectroscopy analysis. No soil sample was collected from the Location 1306D excavation bottom, since the elevated material was likely removed during the CDPH-RHB surface soil sample collection activities. Details related to the Location 1306D investigation activities are described in Section 2.5. Soil samples were also collected from the excavated materials for waste characterization as low-level radioactive waste (LLRW). The HPNS laboratory analytical results are provided in Appendix E.

1.4.2 Excavation and Mitigation Methodology

Handheld survey instruments were used to determine the lateral extent of the suspect areas and determine whether soil removal was a viable option to mitigate the potential radiological hazards. To expedite the mitigation of the potential hazards, utility locator services were not employed. Consequently, the limited excavation activities were performed by radiologically

trained workers using shovels and digging to a maximum depth of 18 inches bgs, or until gamma exposure rates were indistinguishable from background levels, as agreed to by the CDPH-RHB on-site representative. Background levels for each of the five suspect locations were determined by radiologically scanning the ground surface at least 6 feet from the area of elevated radioactivity using a Ludlum 2350-1 rate meter equipped with a Ludlum 44-10 2-inch by 2-inch sodium iodide (NaI) gamma scintillation detector and a Bicron Microrem meter. The instrument certifications are provided in Appendix B.

Radiological commodities, if identified, were removed from the excavations, placed in plastic bags, and assigned a unique identification number. Each commodity would then be transferred to a special container at the NAVSTA TI Building 570 complex for storage pending off-site disposal as LLRW.

Once TtEC and CDPH-RHB representatives concurred that no further soil should be removed from the shallow excavations at each of the suspect locations and a soil sample was collected from the bottom material, the excavation was lined with plastic and backfilled with sand. Following backfill activities, a surface dose rate measurement was collected to ensure that the surface area was no longer a potential hazard to the public health and safety, and the environment.

1.5 PHOTOGRAPHS

The fieldwork performed during the NAVSTA TI radiological investigation and source removal activities was documented using a photographic record. Photographs of the fieldwork are provided prior to the appendices.

2.0 RESPONSE ACTION

TtEC professional staff accompanied by senior Radiation Control Technicians and radiologically trained workers met with CDPH-RHB representatives led by John Fassell at Building 1128 on March 20, 2013 to initiate the investigation and mitigation field activities. The fieldwork continued from March 20 through March 21, 2013. The following sections describe and summarize the radiological investigation and mitigation activities performed at NAVSTA TI to verify the presence of elevated radioactivity concentrations identified by the CDPH-RHB during public health screening activities and mitigate any potential radiological hazards to protect the public health and welfare, and the environment.

2.1 LOCATION 1128E

The radiological investigation activities were initiated at Location 1128E near Building 1128 on March 20, 2013 (Figure 1-1). The background gamma radiation level was established at approximately 6,500 to 7,000 counts per minute (cpm). Ambient dose rates measured using a Bicron Microrem meter indicated a background level in adjacent areas in the range of 4 to 5 microroentgens equivalent man per hour (µrem/hour). Following the sample collection methodology described in Section 1.4.1, TtEC collected a sample from the top 6 inches of soil at the area of elevated radioactivity identified by CDPH-RHB (Location 1128E) near Building 1128. The soil sample (Sample 13AB1128-001) was divided into two bags, which were split between TtEC and the CDPH-RHB.

A flat, hexagonal-shaped commodity was discovered at a depth of approximately 6 inches bgs during the investigation activities on March 20, 2013. On contact, the commodity measured 20 milliroentgens equivalent man per hour (mrem/hour) using the Bicron Microrem meter. Subsequent measurements collected with an Eberline RO-20 ion chamber survey meter indicated a beta exposure of 4.5 radiation absorbed dose per hour (rad/hour) based on an open window measurement and a 35 milliroentgens per hour (mR/hour) gamma exposure rate based on a closed window measurement on contact.

Following removal of the Location 1128E commodity, excavation activities continued to a depth of approximately 18 inches bgs. The completed excavation measured 18 inches by 18 inches by 18 inches. Using a Ludlum 2350-1 rate meter equipped with a Ludlum 44-10 sodium iodide (NaI) detector, measurements collected from the bottom of the excavation were approximately 12,000 cpm. This measurement was elevated above background, which may have been due to the geometry effects of measuring gamma radiation from excavation sidewalls as well as the bottom, or a result of residual contamination, or a combination of the two. However, the CDPH-RHB representative concurred that a sufficient volume of contaminated soil had been removed to be protective of the public health from surface radiation exposures.

A soil sample was collected from the material removed during the excavation process for waste characterization purposes (Sample 13AB1128-002). In addition, a soil sample was collected from the bottom of the excavation (Sample 13AB1128-003). Both soil samples were submitted under chain-of-custody to the HPNS laboratory for analysis by gamma spectroscopy. The chain-of-custody documentation is provided in Appendix D.

The shallow excavation was lined with plastic and backfilled with sand following concurrence from the CDPH-RHB that a sufficient volume of soil had been removed. Using a Bicron microrem meter over the backfilled Location 1128E surface showed a residual dose rate of 4 μrem/hour.

Due to inclement weather conditions, TtEC and CDPH-RHB representatives agreed to discontinue operations for the day and continue the investigation and mitigation activities the following morning. TtEC decontaminated the tools and equipment used during the sample collection activities and transported the split sample to Building 570. However, CDPH-RHB subsequently elected to continue collecting soil samples from the areas of elevated activity associated with Locations 1303A, 1303B, 1306C, and 1306D without the presence of TtEC representatives and coordinate transfer of the split soil samples for analysis. TtEC's Radiation Safety Officer (RSO) arranged for CDPH-RHB staff to turn over the split soil samples to TtEC personnel at a secure location where TtEC's Radiation Safety Officer Representative (RSOR) would retrieve them the following morning. The RSOR retrieved the four split samples collected by CDPH-RHB at Locations 1303A (Sample 13AB1303-001), 1303B (Sample 13AB1303-002), 1306C (Sample 13AB1306-001), and 1306D (Sample 13AB1306-002). These soil samples were submitted under chain of custody to the HPNS laboratory for analysis by gamma spectroscopy. The chain-of-custody documentation is provided in Appendix D.

2.2 LOCATION 1303A

TtEC performed the investigation and mitigation activities at Location 1303A on March 21, 2013. A representative from CDPH-RHB observed the fieldwork. Since a surface soil sample (Sample 13AB1303-001) was collected by CDPH-RHB within the first 6 inches of soil the previous day, no further surface soil samples were collected. Using the methodologies described in Section 1.4, TtEC applied plastic sheeting around Location 1303A and collected surface soil measurements using a Bicron Microrem meter, and a Ludlum 2350-1 meter. The resulting measurements were 1 mrem/hour and 150,000 cpm, respectively. The calibration certifications for each of these instruments are provided in Appendix B.

Using a shovel and hand trowel, TtEC workers removed the soil at Location 1303A to a depth of approximately 10 inches bgs. No specific commodity was found during the excavation activities. The completed excavation measured approximately 18 inches by 18 inches by 10 inches. Using the Ludlum Model 2350-1 instrument over the bottom of the Location 1303A excavation resulted in a measurement of 12,000 cpm. A soil sample was collected from the

material at the bottom of the excavation (Sample 13AB1303-003), and a representative soil sample (Sample 13AB1303-004) was collected from the excavated material for waste characterization as LLRW. Each of the soil samples was submitted under chain-of-custody documentation to the HPNS laboratory for analysis by gamma spectroscopy. The chain-of-custody documentation is provided in Appendix D.

The Location 1303A excavation was lined with plastic and backfilled with sand following concurrence from the CDPH-RHB that a sufficient volume of soil had been removed. A measurement collected with a Bicron Microrem meter over the surface of the backfilled excavation showed a residual dose rate of 4 µrem/hour.

2.3 LOCATION 1303B

Radiological investigation activities were performed at Location 1303B on March 21, 2013 (Figure 1-1). Using a Ludlum 2350-1 and a Bicron Microrem meter, TtEC obtained measurements at the Location 1303B surface of 10,000 cpm and 20 µrem/hour, respectively. Location 1303B was prepared for the investigation activities as described in Section 1.4. Since a surface soil sample (Sample 13AB1303-002) had been previously collected and split between TtEC and CDPH-RHB, no further surface soil samples were collected.

Soil was removed from Location 1303B using a shovel and hand trowel to a depth of approximately 9 inches bgs. No specific commodity that was clearly the source of the elevated readings was removed. At completion, Location 1303B measured approximately 12 inches by 12 inches by 9 inches. Using a Ludlum Model 2350-1, TtEC collected a measurement of 7,000 cpm over the bottom of the excavation. With the concurrence of the CDPH-RHB representative that the source of the elevated measurements appeared to have been mitigated, TtEC collected a soil sample from the material at the bottom of the excavation (Sample 13AB1303-005) for analysis by gamma spectroscopy. No soil sample was collected from the excavated material for waste characterization as LLRW since a characterization sample had been collected from the nearby Location 1303A excavated material. The soil sample collected from the bottom of the Location 1303B excavation was submitted under chain of custody to the HPNS laboratory for analysis. The chain-of-custody documentation is provided in Appendix D.

At the conclusion of the excavation activities, the Location 1303B excavation was lined with plastic and backfilled with sand. A measurement collected with a Bicron Microrem meter over the surface of the backfilled excavation showed a residual dose rate of 4 µrem/hour.

2.4 LOCATION 1306C

Accompanied by CDPH-RHB, TtEC performed the investigation and mitigation activities at Location 1306C on March 21, 2013 (Figure 1-1). Since a surface soil sample (Sample 13AB1306-001) was collected and split between TtEC and CDPH-RHB, no further surface soil samples were collected. Using the methodologies described in Section 1.4, TtEC applied plastic

sheeting around Location 1306C and collected surface soil measurements using a Bicron Microrem meter and a Ludlum Model 2350-1 gamma rate meter. The resulting measurements were 240 μrem/hour and 60,000 cpm, respectively. The instrument certifications are provided in Appendix B.

TtEC workers removed the soil at Location 1306C using a shovel and a hand trowel to a depth of approximately 10 inches bgs, when a flat, octagonal metallic commodity was found. Using a Bicron Microrem meter and a Ludlum Model 2350-1 instrument, the Location 1306C commodity measured 200 mrem/hour and 2,000,000 cpm, respectively, on contact (Figure 1-1). Additional measurements were collected at the HPNS laboratory on the following day using an Eberline RO-20 ion chamber survey meter. The commodity measurement results indicated a beta exposure of 1 rad/hour based on an open window measurement and a 60 mR/hour gamma exposure rate based on a closed window measurement. The commodity was removed from the excavation, placed in a plastic bag, and assigned a unique identification number.

Following removal of the commodity, excavation continued at Location 1306C to a depth of approximately 16 inches bgs. The completed excavation measured about 16 inches by 20 inches by 16 inches. Using a Ludlum Model 2350-1 gamma meter, TtEC obtained a measurement of approximately 26,000 cpm over the bottom of the Location 1306C excavation.

A soil sample (Sample 13AB1306-004) was collected from the material at the bottom of the excavation, and a representative soil sample (Sample 13AB1306-003) was collected from the excavated material for waste characterization as LLRW. Each of the soil samples was submitted under chain-of-custody documentation to the HPNS laboratory for analysis by gamma spectroscopy. The chain-of-custody documentation is provided in Appendix D.

With the concurrence of the CDPH-RHB representative that a sufficient volume of elevated soil had been removed to be protective of the public health, the Location 1306C excavation was lined with plastic and backfilled with sand. TtEC collected a final measurement of 4 μrem/hour using a Bicron Microrem meter held over the surface of the backfilled excavation.

2.5 LOCATION 1306D

TtEC and CDPH-RHB performed investigation activities at Location 1306D (Figure 1-1) on March 21, 2013. Since a surface soil sample (Sample 13AB1306-002) was collected by CDPH-RHB within the first 6 inches of soil the previous day, no further surface soil samples were collected. Using a Bicron Microrem meter and a Ludlum Model 2350-1 instrument, TtEC collected surface soil measurements of 4 μR/hour and 7,000 cpm, respectively. Based on these results, TtEC and CDPH-RHB concluded that the elevated material found at Location 1306D was likely removed during the surface soil sample collection activities, and no further excavation would be necessary to protect public health.

3.0 SITE RESTORATION

Site restoration activities were performed following the completion of the radiological investigation and source removal activities. At the completion of the soil removal activities, each excavation was lined with plastic and backfilled with sand material, and sod was placed over the backfilled excavation.

4.0 LABORATORY ANALYTICAL RESULTS

The following sections discuss the laboratory analytical results for the soil samples collected from each of the locations identified in IR Site 12 by the CDPH-RHB with elevated radiological measurements. Figure 1-1 depicts the soil sample collection locations and provides a summary of the soil sample analytical results. The laboratory analytical reports are presented in Appendix E.

4.1 LOCATION 1128E

The HPNS laboratory analytical results for the surface soil sample (Sample 13AB1128-001) collected from Location 1128E indicated the presence of Ra-226 at 469.4 picocuries per gram (pCi/g). In addition, the waste characterization soil sample analytical results (Sample 13AB1128-002) contained a Ra-226 concentration of 42.54 pCi/g. The analytical results for the soil sample (Sample 13AB1128-003) collected at the bottom of the excavation (approximately 18 inches bgs) identified the presence of residual Ra-226 at 8.344 pCi/g.

4.2 LOCATION 1303A

The HPNS laboratory analytical results for the surface soil sample (Sample 13AB1303-001) collected from Location 1303A identified the presence of Ra-226 at an estimated concentration exceeding 30,000 pCi/g. This soil sample could not be effectively quantified at the HPNS laboratory due to the excessive dead time caused by the elevated sample concentration. In addition, the waste characterization soil sample analytical results (Sample 13AB1303-003) contained an Ra-226 concentration of 823.3 pCi/g. The laboratory analytical results for the soil sample (Sample 13AB1303-004) collected from the bottom of the Location 1303A excavation (approximately 10 inches bgs) indicated the presence of residual Ra-226 at 2.174 pCi/g.

4.3 LOCATION 1303B

The HPNS laboratory analytical results for the surface soil sample (Sample 13AB1303-002) collected from Location 1303B identified the presence of Ra-226 at 309.5 pCi/g. The analytical results for the soil sample (Sample 13AB1303-005) collected at the bottom of the excavation (approximately 9 inches bgs) identified the presence of residual Ra-226 at 4.853 pCi/g. No waste characterization soil sample was collected from Location 1303B.

4.4 LOCATION 1306C

The HPNS laboratory analytical results for the surface soil sample (Sample 13AB1306-001) collected from Location 1306C identified the presence of Ra-226 at 92.82 pCi/g. In addition, the waste characterization soil sample analytical results (Sample 13AB1306-003) contained an Ra-226 concentration of 6,147 pCi/g. The laboratory analytical results for the soil sample (Sample 13AB1306-004) collected from the bottom of the Location 1306C excavation (approximately 16 inches bgs) identified the presence of residual Ra-226 activity at 45.29 pCi/g.

4.5 LOCATION 1306D

The HPNS laboratory analytical results for the surface soil sample (Sample 13AB1306-002) collected from Location 1306D identified the presence of Ra-226 at 2,022 pCi/g. As described in Section 2.5, the cause of the elevated instrument readings was likely removed with the surface soil sample. With the concurrence of the CDPH-RHB, no further soil samples or mitigation efforts were performed for Location 1306D.

5.0 CONCLUSIONS

The DON directed TtEC to perform a radiological investigation at NAVSTA TI. The purpose of the investigation was to verify the presence of elevated radioactivity concentrations identified by the CDPH-RHB during public health screening activities and mitigate any potential radiological hazards to protect the public health and welfare, and the environment. TtEC and CDPH-RHB performed the investigation and mitigation activities on March 20 and March 21, 2013.

Material and equipment survey results for equipment used during the investigation identified no residual radiological contamination. Air monitoring sample analytical results did not exceed 10 percent of the derived air concentration for Ra-226.

Waste generated during soil excavation activities was containerized in 55-gallon drums. The waste materials were transferred to the NAVSTA TI Building 570 complex for storage pending off-site disposal by the DON's LLRW contractor. Investigation and removal activities at Locations 1128E and 1306C yielded similar metallic commodities that appear to be the source of the elevated Ra-226 concentrations in those areas. These commodities were placed in a designated storage container within the NAVSTA TI Building 570 complex.

Based on the investigation activities and laboratory analytical results, the five IR Site 12 locations of elevated radioactivity have been sufficiently mitigated, and the surface gamma exposure rates are essentially indistinguishable from background levels following excavation and backfill activities. A summary of the radiological measurements and soil sample analytical results is provided on Figure 1-1.

PRE-CONSTRUCTION CONFERENCE AGENDA

TETRA TECH ECI REMEDIATION CONTRACT INFORMATION				
Contract/Task-Delivery Order Number: N62473-10-D-0809 CTO #0013	Project Title: NTCRA for Solid Waste Disposal Area-Radiological Hot Spot Removal & Bldg Demolition at IR Site 12, Treasure Island, CA Pre-Construction Meeting Scheduled for 13 May 2013 @ 10:00am at TI CSO Conference Room, Building 1or via Conference Call: Toll Free: 1(866) 692-5721 Guest Code: 8175375#			
Award Date: 21 August 2012	Award Amount: $797,301	Contract Duration:	Completion Date (Through Mod # 03) 21 February 2014	Liquidated Damages: N/A
Contractor: Tetra Tech ECI		A-E: N/A		

I. Introductions.

II. Project History, Scope & Schedule to be presented by the Contractor Project Manager

III. Key Players

1. Client: BRAC PMO

2. Field Office: ROICC SF Bay - CSO

Title	Area of Responsibility	Name	Phone No.
RPM	Overall responsibility for this project Technical/Engineering/Financial.	Tony Konzen	619-532-0924
Lead RPM		David Clark	619-532-0973
ROICC SF Bay Office	Overall responsibility for ROICC SF Bay	LT Jeremy Schwartz	510-521-8672
ROICC Supervisory Engineer	Overall responsibility for Technical/Engineering	Franklin Fernandez	510-755-5877
ROICC Construction Manager	Technical/QA/Safety	Gary J. Munekawa	510-755-5879
ROICC Engineering Technician/Quality Assurance	Quality assurance and safety.	David R. Smith	510-755-5880

CSO	CSO Supervisor	Patricia McFadden	415-743-4720
CSO	CSO Environmental POC	Doug DeLong	415-743-4713
CSO	Facility Manager	Glen Nelson	415-743-4703
Contracting Officer	Overall responsibility for Contractual matters	Cynthia Mafara	619-532-0978
Contracts Specialist	Contract modifications/Invoicing/payrolls.	Karen Barba	619-532-0786

3. Contractor: Tetra Tech, ECI

Title	Name	Phone No.
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Back-up Superintendent	Chris Hanif	510-967-1710 Mobile
Quality Control Manager	Richard Kanaya	415-216-2759 Desk 415-516-9583 Mobile
Alternate Quality Control Manager	Richard Weingarz	425-785-9220 Mobile
Site Safety Officer	Dan Keenan	415-272-1015 Mobile
Alternate Site Safety Officer	Andrew Gorman	425-241-0713 Mobile
RSOR	George Chiu	415-216-2745 Desk 714-270-4009

IV. COMMUNICATIONS

1. RPM is the main technical point of contact for this project.
2. **The ROICC Project Engineer/Engineering Technician is the first point of contact on most health and safety and fieldwork matters**.
3. **Copy RPM and CSO on all facilities, technical, safety and QC communication.**
4. **When sending e-mails to the ROICC office, send to both Gary Munekawa and David Smith.**

5. Notify the ROICC SF Bay Construction Manager (Gary Munekawa) on all field safety and QC issues. For actions requiring a Contracting Officer, such as adding or deleting work, your point of contact is Cynthia Mafara. Changes or modifications to the contract may only be executed by the contracting officer.
6. Include the Company name, contract number and CTO number on all, reports and letters and serialize them for this contract.

Send all ROICC correspondence to
950 West Mall Square
Bldg. 1, Suite 160, West Wing, Mail Stop 2
Alameda, CA 94501 or

Via: US Post Office:

ROICC (Moffett Site Office)
Moffett Federal Airfield
PO Box 68
Moffett Field, CA 94035-0068

Via overnight delivery service:

ROICC (Moffett Site Office)
Moffett Federal Airfield
Bldg 107 (corner of Wescoat Rd & McCord Ave)
Moffett Field, CA 94035

7. ROICC Fax # is 650-603-9838. **Copy RPM and CSO on all electronic submittals.**

V. GETTING STARTED

1. Site Access/Administration /Security

    a. Coordinate site access with CSO if necessary.
    b. No firearms or controlled substances are allowed on site.
    c. Permits for any photographic or recording equipment are not required.
    d. Safety and Health Bulletin: The contractor shall erect a Safety and Health Bulletin in compliance with EM 385-1-1, 01.A.06 (a thru i) requirements.
    e. Bldg 570 will the on-site location for TetraTech for this CTO.

2. Fire Protection – Contractor is responsible for fire prevention on the job site.

3. Requirements Prior to Starting Construction

    a. Bonds and Insurance.

b. List of Contractor and Subcontractor personnel (Organization Chart) with recall numbers.
c. Quality Control Plan (20 working day ROICC review time): (below is done)
    1) QC Manager and Alternate Letter of Authority - Contractor to provide in the QC Plan and Original to Contract Specialist prior to mobilizing to the field.

       Tetra Tech will provide a Alternate Letter for QC Manager listing Richard Weingarz to replace Adam Berry in the CQC Plan.
d. Accident Prevention Plan and Site Specific Health and Safety Plan.

e. Environmental Protection Plan, SWPP & Waste Management Plan.

f. Schedule of Prices.
    1) Must be submitted and approved by the Contracting Officer prior to processing the first payment. If a cost loaded CPM schedule is required the schedule of prices may be omitted.
g. Progress Schedule.
    1) Submit a realistic construction schedule to the government for approval. Must be submitted and accepted by the Contracting Officer prior to beginning construction.

       Work Item Descriptions (include administrative items required under the contract such as: submission, review and approval of submittals, testing and inspection) and their start dates, duration, dependencies, and completion dates.

       Critical Work Items, which if not done as scheduled, will delay the start or completion of the whole project (i.e. critical path items).
h. Permits (if required or specified by Contract).
    1) Contracting Officer to verify Contractor has received required permits and verify permits remain valid for the duration of the work.
    2) Contractor ensures permitting action required of Contractor is fulfilled prior to executing work covered by the permit.
    3) Dig Permit. Contact Glen Nelson, CSO.
i. Submittals. Submittal requirements are stated in the contract. The QC Manager must maintain a current copy of the submittal register at the job site. The contractor must include what specific specification is being submitted.
j. Radiation Briefings. The RSOR, George Chiu will provide Treasure Island-specific radiation training to the ROICC near the start of the project.

V. DOING BUSINESS

1. <u>Jobsite</u>

    a. Safety FIRST!
        1) Goal is ZERO safety violations. Safety Sup can (will) be removed unilaterally if non-responsive or non-responsible.
        2) COE EM 385-1-1 and OSHA rules.
        3) Safety record will weigh heavily in contractor evaluation.

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-10-D-0809
CTO NO. 0013

FINAL

RADIOLOGICAL INVESTIGATION AND SOURCE REMOVAL ON MARCH 20 AND 21, 2013

February 2014

DCN: RMAC-0809-0013-0010

INSTALLATION RESTORATION SITE 12
FORMER NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-10-D-0809
CTO NO. 0013

FINAL

RADIOLOGICAL INVESTIGATION AND SOURCE REMOVAL ON MARCH 20 AND 21, 2013

February 2014

INSTALLATION RESTORATION SITE 12
FORMER NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

DCN: RMAC-0809-0013-0010

Prepared by:

TETRA TECH EC, INC.
1230 Columbia Street, Suite 750
San Diego, California 92101-8536

Erik Abkemeier, CHP, PE, CSP, CHMM
Radiation Safety Officer

Bill Dougherty
Project Manager

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APPENDICES

1.0 INTRODUCTION

The U.S. Department of the Navy (DON) directed Tetra Tech EC, Inc. (TtEC) to perform a radiological investigation at former Naval Station Treasure Island (NAVSTA TI) on March 19, 2013. The purpose of the investigation was to verify the presence of elevated radioactivity concentrations identified by the California Department of Public Health – Radiologic Health Branch (CDPH-RHB) during public health screening activities and mitigate any potential radiological hazards to protect the public health and welfare, and the environment. The NAVSTA TI investigation and mitigation activities were performed under Contract No. N62473-10-D-0809 and Contract Task Order 0013. The radiological work activities were performed in compliance with TtEC's California Department of Public Health Radioactive Material License No. 7909-01.

1.1 BACKGROUND

Located in San Francisco Bay (Bay) to the east of the City of San Francisco, California, NAVSTA TI comprises two contiguous islands. Bisected by the San Francisco Bay Bridge, Treasure Island on the north is approximately 403 acres in size and Yerba Buena Island to the south is about 147 acres in size. Treasure Island is manmade and constructed of materials dredged from the Bay. Prior to the construction of Treasure Island, military activities in the area date back to 1866 when the U.S. government took possession of Yerba Buena Island for defensive fortifications. In 1993, NAVSTA TI was designated for closure under the Base Closure and Realignment Act of 1990 and was finally closed on September 30, 1997. The property is currently undergoing the transfer process.

Installation Restoration (IR) Site 12 is located on a relatively flat 93-acre area within the northwest portion of NAVSTA TI. IR Site 12 consists of multiplex housing units with private backyards and common area front yards, side yards, and surrounding greenbelts. Originally, this area was used as a parking lot during the 1939–1940 Golden Gate International Exposition. Following occupation of the NAVSTA TI by the DON in 1940, the area was developed for bunker storage of munitions and other materials, vehicle equipment and storage, recreational playing fields, and disposal or burning of solid waste. Beginning in the 1960s, areas of IR Site 12 were incrementally developed into housing units for DON personnel and their dependents.

1.2 CDPH-RHB HEALTH AND SAFETY SURVEYS

At the request of the Treasure Island Development Authority (TIDA), CDPH-RHB conducted walk-over radiological surveys in the occupied housing area of IR Site 12 at NAVSTA TI from approximately March 11 through March 22, 2013. Representatives from CDPH-RHB performed these surveys using a Ludlum Model 19 MicroR survey meter. The initial survey results identified five distinct locations within IR Site 12 with exposure rates that exceeded the

background exposure rate of 4 to 6 microroentgens per hour (μR/hour) at a height of approximately 3 feet above ground surface. These areas were identified as Locations 1303A and 1303B situated to the west of Building 1303, Locations 1306C and 1306D situated to the south of Building 1306, and Location 1128E situated to the east of Building 1128. The elevated exposure rates ranged from 17 μR/hour at Location 1303B to 4,200 μR/hour at Location 1128E. Using an in situ gamma spectroscopy Inspector 1000 instrument, CDPH-RHB determined that the areas of elevated activity were due to the presence of radium-226 (Ra-226). Each of these locations within IR Site 12 and the associated exposure rate measurements are provided on Figure 1-1.

1.3 RESPONSE ACTION

The DON convened a teleconference with representatives from the Radiological Affairs Support Office, CDPH-RHB, and TtEC on March 19, 2013 to determine the best course of action to address the five suspect areas of elevated activity in IR Site 12. At the conclusion of the teleconference, the DON directed TtEC to meet with CDPH-RHB representatives at NAVSTA TI and confirm their findings, perform radiological screening, and coordinate with CDPH-RHB in the collection of split soil samples. In addition, the DON directed TtEC to implement the measures necessary to mitigate potential radiological hazards to protect the public health and welfare, and the environment. The mitigation measures included limited soil excavation in those areas of confirmed elevated radioactivity to ensure that residual radiation concentrations were indistinguishable from background concentrations following backfill and site restoration. If source removal was unsuccessful, TtEC was directed to perform other mitigation measures including the placement of a steel plate over the area and/or installing temporary fencing to limit public access until further direction from the DON was obtained.

1.4 METHODOLOGY

TtEC prepared a Radiation Work Permit (RWP) for the anticipated radiological investigation and removal activities prior to mobilizing to the field. The RWP specified the radiological controls to be used during the investigation and removal activities. A copy of the RWP is provided in Appendix A.

TtEC's methodology for performing the radiological investigation and removal activities included the mobilization of radiologically trained workers who were thoroughly briefed on the requirements of the RWP. Only calibrated instruments were utilized, and a response check was performed at the beginning of each day prior to use. The instrument calibration certificates are provided in Appendix B. In addition, tools and equipment were procured including new shovels, trowels, buckets, and drums to eliminate the possibility of cross-contamination. The tools and equipment were decontaminated prior to being used at each of the suspect sites.

Prior to beginning intrusive activities, plastic sheeting was placed around the suspect areas to limit the spread of potential contamination. In addition, radiological air samples were collected using a low-volume air sampler at a rate of one sample per day in the vicinity of the intrusive activities. The air monitoring samples were subsequently submitted to the Curtis and Tompkins on-site laboratory located at Hunters Point Naval Shipyard (HPNS) in San Francisco, California for analysis. None of the air monitoring sample results exceeded 10 percent of the derived air concentration for Ra-226. The air monitoring sample analytical results are provided in Appendix C.

1.4.1 Soil Sample Collection Methodology

Soil samples were collected using a hand trowel or core sampler between ground surface and a depth of 6 inches below ground surface (bgs) at each of the five suspect locations. The collected sample materials were subsequently split between CDPH-RHB personnel and TtEC for submittal to separate laboratories for gamma spectroscopy analysis. The TtEC split samples were submitted under chain of custody to the HPNS laboratory for analysis. The chain-of-custody documentation is provided in Appendix D.

Typically, soil samples analyzed for Ra-226 using gamma spectroscopy must achieve secular equilibrium with its progeny (21-day ingrowth), including bismuth-214 and lead-214 to obtain definitive quantitative results. However, pending receipt of the 21-day ingrowth quantitative results, a conservative estimate of Ra-226 concentrations can be made using direct analysis of the 186.2 kiloelectron-volt (keV) gamma energy peaks. The soil sample analytical results provided in this report and summarized in Appendix E are reported using the 186.2 keV gamma energy peak.

Soil samples were collected from each of the five suspect locations with elevated activities. In addition to the near-surface soil samples split with CDPH-RHB, a soil sample was collected from the excavation bottoms at Locations 1128E, 1303A, 1303B, and 1306C and submitted to the HPNS laboratory for gamma spectroscopy analysis. No soil sample was collected from the Location 1306D excavation bottom, since the elevated material was likely removed during the CDPH-RHB surface soil sample collection activities. Details related to the Location 1306D investigation activities are described in Section 2.5. Soil samples were also collected from the excavated materials for waste characterization as low-level radioactive waste (LLRW). The HPNS laboratory analytical results are provided in Appendix E.

1.4.2 Excavation and Mitigation Methodology

Handheld survey instruments were used to determine the lateral extent of the suspect areas and determine whether soil removal was a viable option to mitigate the potential radiological hazards. To expedite the mitigation of the potential hazards, utility locator services were not employed. Consequently, the limited excavation activities were performed by radiologically

trained workers using shovels and digging to a maximum depth of 18 inches bgs, or until gamma exposure rates were indistinguishable from background levels, as agreed to by the CDPH-RHB on-site representative. Background levels for each of the five suspect locations were determined by radiologically scanning the ground surface at least 6 feet from the area of elevated radioactivity using a Ludlum 2350-1 rate meter equipped with a Ludlum 44-10 2-inch by 2-inch sodium iodide (NaI) gamma scintillation detector and a Bicron Microrem meter. The instrument certifications are provided in Appendix B.

Radiological commodities, if identified, were removed from the excavations, placed in plastic bags, and assigned a unique identification number. Each commodity would then be transferred to a special container at the NAVSTA TI Building 570 complex for storage pending off-site disposal as LLRW.

Once TtEC and CDPH-RHB representatives concurred that no further soil should be removed from the shallow excavations at each of the suspect locations and a soil sample was collected from the bottom material, the excavation was lined with plastic and backfilled with sand. Following backfill activities, a surface dose rate measurement was collected to ensure that the surface area was no longer a potential hazard to the public health and safety, and the environment.

1.5 PHOTOGRAPHS

The fieldwork performed during the NAVSTA TI radiological investigation and source removal activities was documented using a photographic record. Photographs of the fieldwork are provided prior to the appendices.

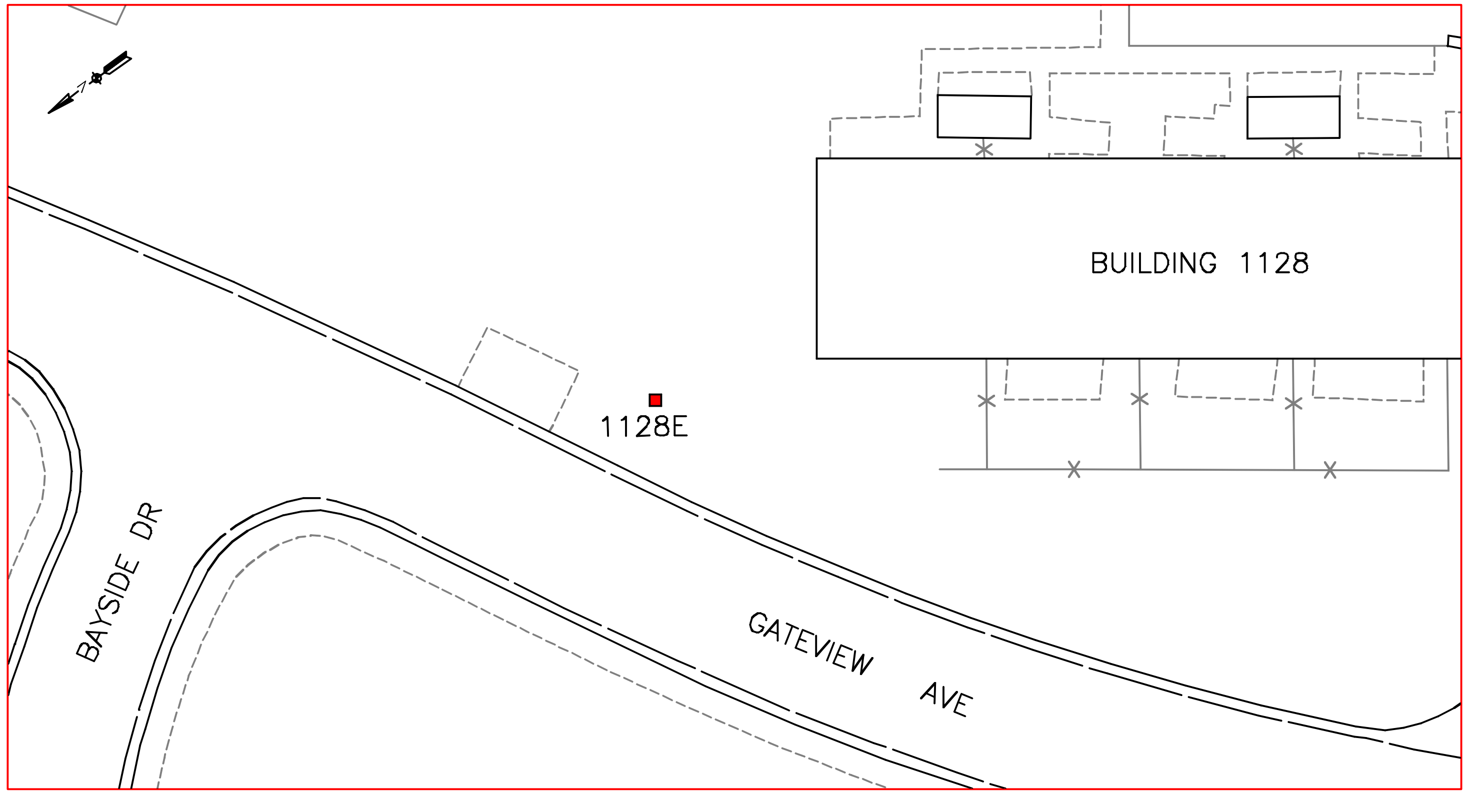
5.0 CONCLUSIONS

The DON directed TtEC to perform a radiological investigation at NAVSTA TI. The purpose of the investigation was to verify the presence of elevated radioactivity concentrations identified by the CDPH-RHB during public health screening activities and mitigate any potential radiological hazards to protect the public health and welfare, and the environment. TtEC and CDPH-RHB performed the investigation and mitigation activities on March 20 and March 21, 2013.

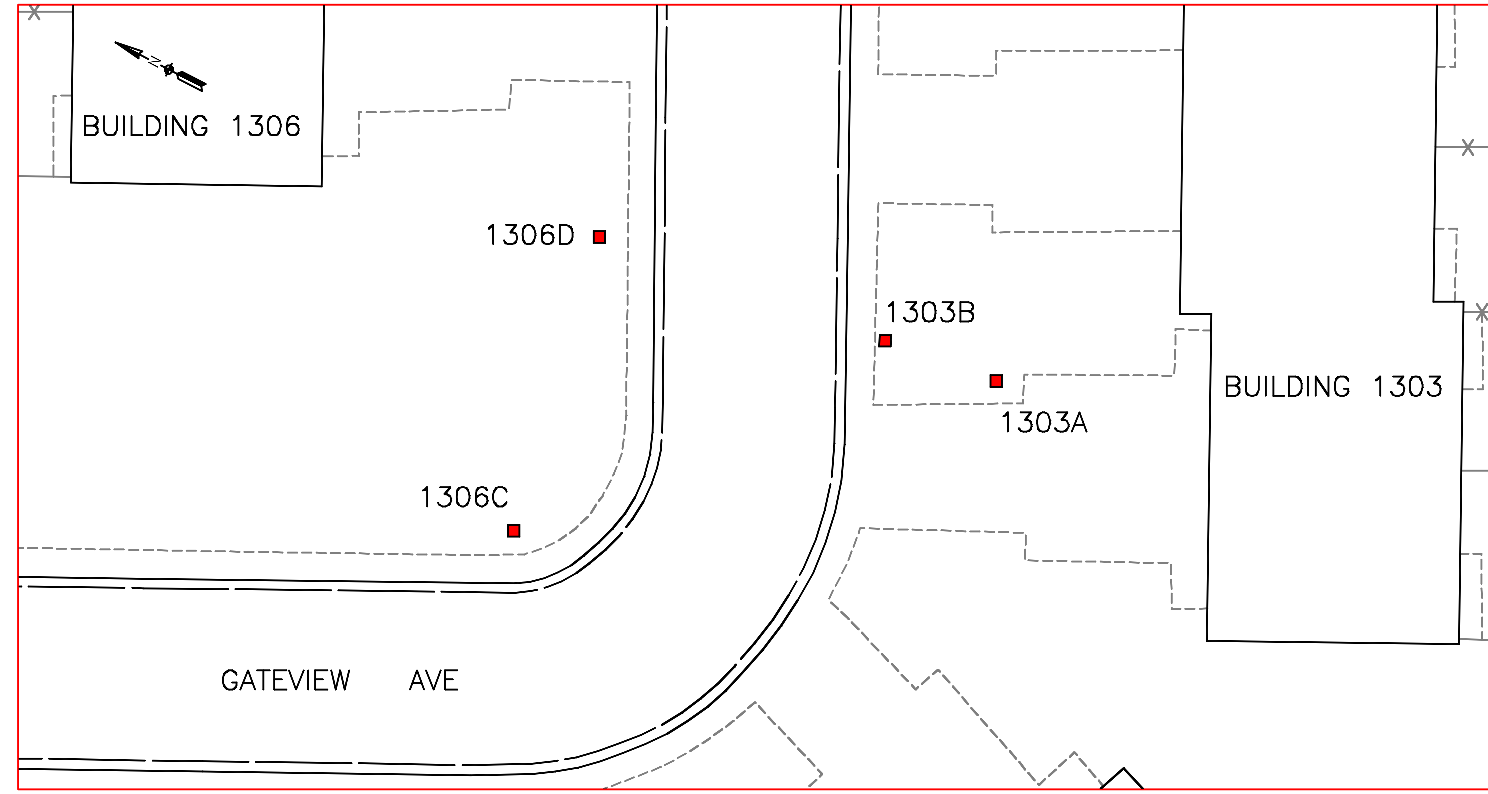
Material and equipment survey results for equipment used during the investigation identified no residual radiological contamination. Air monitoring sample analytical results did not exceed 10 percent of the derived air concentration for Ra-226.

Waste generated during soil excavation activities was containerized in 55-gallon drums. The waste materials were transferred to the NAVSTA TI Building 570 complex for storage pending off-site disposal by the DON's LLRW contractor. Investigation and removal activities at Locations 1128E and 1306C yielded similar metallic commodities that appear to be the source of the elevated Ra-226 concentrations in those areas. These commodities were placed in a designated storage container within the NAVSTA TI Building 570 complex.

Based on the investigation activities and laboratory analytical results, the five IR Site 12 locations of elevated radioactivity have been sufficiently mitigated, and the surface gamma exposure rates are essentially indistinguishable from background levels following excavation and backfill activities. A summary of the radiological measurements and soil sample analytical results is provided on Figure 1-1.



DETAIL A



DETAIL B

LEGEND:

■ – ELEVATED RADIOACTIVITY LOCATION

IR – INSTALLATION RESTORATION

CDPH–RHB – CALIFORNIA DEPARTMENT OF PUBLIC HEALTH – RADIOLOGIC HEALTH BRANCH

HPNS – HUNTERS POINT NAVAL SHIPYARD

Measurement	Exposure Rate on Surface Measured by CDPH-RHB[1]	Commodity[2] (on contact)	Commodity[2] (on contact)	CDPH-RHB Split Samples (surface)	Soil Samples from Bottom of Excavation	Gamma Rate[2] after backfill	Exposure Rate[2] after backfill
Meters	Ludlum Model 19	Bicron Microrem	Eberline RO-20 (open window)	HPNS Lab[3]	HPNS Lab[3]	Ludlum Model 2350-1 w/44-10	Bicron Microrem
Background	4-6 microR/hr	4-6 microrem/hr	8-10 microrad/hr	TI uses 0.7 pCi/g	TI uses 0.7 pCi/g	5000-7000 cpm	4-6 microrem/hr
Location							
1303A	1,600	N/A	N/A	Unquantifiable[4]	2.174	10,900	4
1303B	17	N/A	N/A	309.5	4.853	13,800	4
1306C	240	200 millirem/hr	1.0 rad/hr	92.82	45.29	6,700	4
1306D	33	N/A	N/A	2022	N/A	5,300	4
1128E	4,200	20 millirem/hr	4.5 rad/hr	469.4	8.3444	5,300	4

Notes:
[1] Measurements obtained from 03/18/13 G. Perez, CDPH-RHB personal communication
[2] Measurements collected by TtEC
[3] Value based on Ra-226 186.2 keV gamma energy peak
[4] Qualitative estimate from gamma spec indicates >30,000 pCi/g. No split sample with CDPH-RHB due to elevated activity.

15 0 15 30
(feet)

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

SITE LOCATION MAP

FIGURE 1-1

IR SITE 12 RADIOLOGICAL INVESTIGATION AND
SOURCE REMOVAL LOCATIONS

FORMER NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CA

REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

TETRA TECH EC, INC.

Base Realignment and Closure
Program Management Office West
33000 Nixie Way, Bldg. 50
San Diego, California 92147

CONTRACT NO. N62473-10-D-0809
CTO NO. 0025

FINAL

FINAL STATUS SURVEY REPORT
INSTALLATION RESTORATION SITE 6

September 2016

DCN: RMAC-0809-0025-0008

NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

Base Realignment and Closure
Program Management Office West
33000 Nixie Way, Bldg. 50
San Diego, California 92147

CONTRACT NO. N62473-10-D-0809
CTO NO. 0025

FINAL

FINAL STATUS SURVEY REPORT
INSTALLATION RESTORATION SITE 6

September 2016

NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

DCN: RMAC-0809-0025-0008

Prepared by:

TETRA TECH EC, INC.
1230 Columbia Street, Suite 750
San Diego, California 92101-8536

George Chiu
Technical Lead

Steven Adams, CHP
Radiation Safety Officer

Shanti Montgomery
Project Manager

EXECUTIVE SUMMARY

Installation Restoration (IR) Site 6 is located in the northeastern portion of Naval Station Treasure Island in San Francisco, California. This area includes approximately 4.3 acres and is bounded by Avenues I and M, 14th Street, the Naval Station Treasure Island Former Parking and Storage Area, and San Francisco Bay.

IR Site 6 was the former firefighting training school, which was used for various firefighting training activities from 1944 to 1992. In 2007, the fenced-in area between Avenues I and M and 14th Street was designated a staging area for low-level radioactive waste consisting of radiologically impacted soil from a removal action being performed at the adjacent IR Site 12. In 2007 and 2008, soil from the IR Site 12 removal action was stockpiled directly on the ground surface and possibly on the concrete foundation of the former firefighting training school building. Since this single stockpiling event, soil from IR Site 12 has been staged in specially designed roll-off bins pending shipment for off-site disposal.

The Final Historical Radiological Assessment – Supplemental Technical Memorandum (TriEco-Tt 2014) states that the Former Parking and Storage Area is potentially radiologically impacted as a result of the open area south of Former Building 327 (Salvage Building) being used as a salvage yard. The exact location of the salvage yard was not defined in this report. Former Building 327 is located within the Former Parking and Storage Area south of Building 461. The radionuclide of concern identified for IR Site 6 is radium-226.

The Final Status Survey (FSS) was designed in accordance with the Multi-Agency Radiation Survey and Site Investigation Manual (DoD et al. 2000). To perform the survey, IR Site 6 was divided into 17 Class 1 survey units (SUs). The survey results were reviewed to determine whether residual radioactivity was present, and conditions within the SU were compared to background. The final systematic sample radioanalytical results from the ground surfaces at IR Site 6 were comparable to background. When using the higher of the reported activity or the method detection limit, the maximum estimated dose of 1.268 millirem per year (mrem/y) and the increased excess lifetime cancer risk (ELCR) of 2.019×10^{-5} was associated with SU 1. This is significantly lower than the criterion for unrestricted release. The criterion for unrestricted release is an ELCR that falls below the U.S. Environmental Protection Agency (EPA) acceptable risk management level of 3×10^{-4} (EPA 2014), which is equivalent to 12 mrem/y, according to EPA's Office of Solid Waste and Emergency Response guidance document 9285.6-20. This ELCR is more conservative than the Nuclear Regulatory Commission dose-based unrestricted release criterion of 25 mrem/y.

This FSS report details the procedures and results of the surveys performed to facilitate unrestricted radiological release of IR Site 6. Based on these results, the Department of the Navy recommends IR Site 6 for unrestricted radiological release.

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FIGURES

APPENDICES
(on CD)

1.0 SITE DESCRIPTION

1.1 SITE LOCATION AND DESCRIPTION

Installation Restoration (IR) Site 6 is an open space area in the northeastern portion of Naval Station Treasure Island (NAVSTA TI), located in San Francisco, California (see Figure 1-1). Originally, IR Site 6 was bounded by Avenues I and M, 14th Street, and the San Francisco Bay, and encompassed approximately 3.4 acres. In 2003, elevated concentrations of dioxin detected in soils at the site resulted in the expansion of the site to include an adjacent Former Parking and Storage Area southeast of Building 461. Building 461 is not part of IR Site 6, but the adjacent sidewalk and enclosed stairwell on the southeast side of Building 461 are included as part of the site. As a result of this expansion, the site currently encompasses 4.3 acres of open space. The site, prior to performance of the field activities discussed herein, was comprised of unpaved areas (33 percent), asphalt (25 percent), and concrete (42 percent), as shown in Figure 1-1. Figure 1-1 depicts the site conditions prior to the start of the field activities discussed herein.

1.2 PRIOR HISTORICAL USE

IR Site 6 was the former firefighting training school, and was used for various firefighting training activities from 1944 to 1992. In 2007, the fenced-in area between Avenues I and M and 14th Street was designated as a staging area for low-level radioactive waste (LLRW) consisting of radiologically impacted soil from a removal action being performed at adjacent IR Site 12. In 2007 and 2008, soil from the IR Site 12 removal action was stockpiled directly on the ground surface and possibly on the concrete foundation of the former firefighting training school building. After the single stockpiling event, soil was then staged in specially designed roll-off bins pending shipment for off-site disposal. Based on existing data, only one radionuclide of concern (ROC) was identified for IR Site 6, radium-226 (^{226}Ra). LLRW was not stored within the Former Parking and Storage Area.

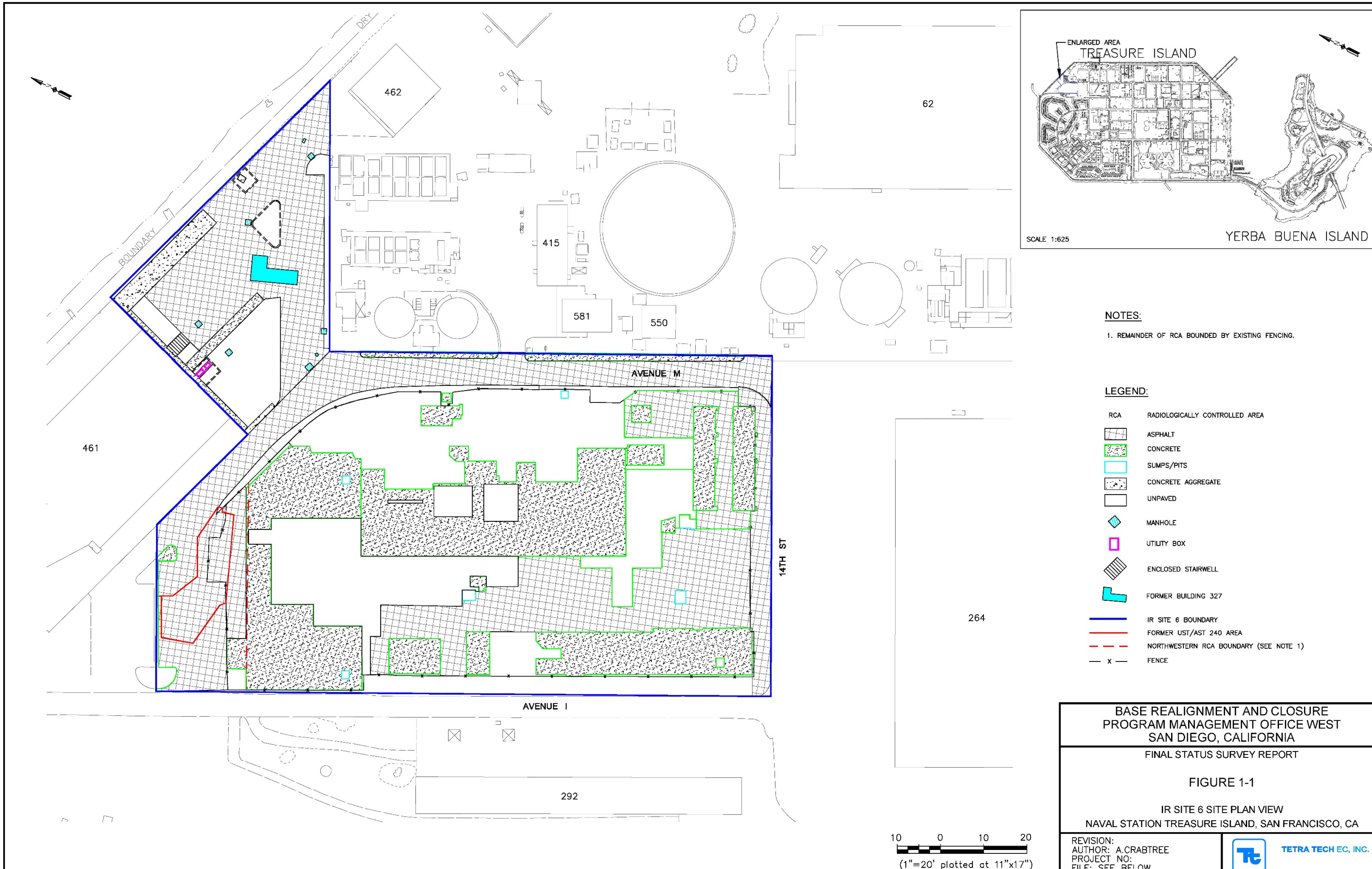
The Final Historical Radiological Assessment – Supplemental Technical Memorandum (HRA-STM) (TriEco-Tt 2014) stated that the Former Parking and Storage Area is potentially radiologically impacted as the open area south of Former Building 327 (Salvage Building) was used as a salvage yard. The exact location of the salvage yard was not defined. Former Building 327 is located within the Former Parking and Storage Area southeast of Building 461 (see Figure 1-1).

1.3 REPORT OBJECTIVE

This report details the procedures and results of the survey and sampling activities performed by Tetra Tech EC, Inc. (TtEC) to defend unrestricted release of IR Site 6. The objective of the report is to prove a sufficient number, locations, quality, and results of radiation surveys combined with

a sufficient number, location, quality, and results of environmental samples will demonstrate that the results meet the release criteria specified in Section 3.0, below.

The appendices to this report are organized as follows: Appendix A provides information about the instrumentation used for the survey. Appendix B provides the associated instrumentation calibration certificates. Appendix C contains the Treasure Island Background Reference Area Memorandum (Shaw 2012). Ancillary, material, and equipment surveys are contained in Appendix D. The figures illustrating survey maps and the final sample locations to support the Final Status Survey (FSS) are included in Appendix E. Appendices F, G, H, and I provide the survey measurement results, gamma survey results, miscellaneous screening U.S. Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP) laboratory results, and FSS radioanalytical results, respectively. Appendix J presents the residual radioactivity (RESRAD) dose and risk modeling summaries. The Task-specific Plan (TSP) for the Radiological Characterization, Remediation, and FSS at IR Site 6 (TtEC 2014a) is included in Appendix K. Appendix L provides information regarding the construction of Building 461 and the adjacent sidewalk and enclosed stairwell on the southeast side of Building 461. Appendix M provides the instrument chi square calculations and quality control documentation. Appendix N presents the Response to Comments on the Draft FSS report.



BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL STATUS SURVEY REPORT

FIGURE 1-1

IR SITE 6 SITE PLAN VIEW
NAVAL STATION TREASURE ISLAND, SAN FRANCISCO, CA

REVISION:
AUTHOR: A.CRABTREE
PROJECT NO:
FILE: SEE BELOW

P:\CAD Project Files\Treasure Island CAD Files\DWG\TI-Site 6_Figure 1-1_02-18-16.dwg

2/18/16

12.0 CONCLUSION AND RECOMMENDATIONS

In total, approximately 3 cubic yards of material (soil and two objects) was remediated. A total of 2 samples identified the presence of ^{226}Ra activity above the screening criterion. The maximum activity identified for ^{226}Ra was 12.29 pCi/g. Elevated activity concentrations were successfully remediated and bounded by clean soil samples. Remediated material (soil and two objects) was transferred to the DON's radiological waste contractor for off-site disposal. Post-remediation sample analytical results revealed that the residual activities were comparable to background. A total of 198 samples were collected over an area of 17,982 m^2, for a sampling density of approximately 1 soil sample per 90.8 m^2. A total of 312 alpha/beta static survey measurements were performed over an area of 3,666 m^2, for a survey density of approximately 1 static measurement per 11.6 m^2. The DON considers these sampling densities sufficient to mitigate any small areas of elevated activity that may have been present at the site.

The survey results were reviewed to determine whether residual radioactivity was present and whether conditions within the SU were comparable to background. The maximum ^{226}Ra concentration from the final definitive systematic samples was 1.03 pCi/g. Evaluation of the systematic sample results indicates that the remaining material within IR Site 6 meets the release criteria. The primary descriptive statistical parameters, including the mean and median, for ^{226}Ra concentrations are less than the corresponding values listed in the Treasure Island Background Area document (Shaw 2012). The maximum ^{226}Ra concentration of 1.03 pCi/g is less than the Treasure Island Background Area upper limit of 1.26 pCi/g as calculated using the third quartile, and is less than the screening criterion of 1 pCi/g above the NAVSTA TI Background Area of 0.668 pCi/g for ^{226}Ra.

The results of the alpha and beta surveys confirmed the absence of radiological contamination on concrete surfaces. The survey results were below the release criteria of 20 dpm/100 cm^2 alpha or 1,000 dpm/100 cm^2 beta removal contamination, or 100 dpm/100 cm^2 alpha or 5,000 dpm/100 cm^2 beta fixed contamination.

The results from all FSS systematic samples were found to be comparable to background. The maximum dose and ELCR when using the higher of the reported activity or the MDA/MDL were 1.268 mrem/y with an ELCR of 2.019×10^{-5} in SU 1. These values are significantly less than the EPA risk management level of 3×10^{-4} (EPA 2014) or 12 mrem/y according to EPA's OSWER 9285.6-20.

Based on these results, the DON recommends IR Site 6 for unrestricted radiological release.

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-06-D-2201
CTO NO. 0021

FINAL

FINAL STATUS SURVEY REPORT FOR BUILDING 343

October 31, 2008

DCN: ECSD-2201-0021-0008

BUILDING 343
NAVAL STATION TREASURE ISLAND
TREASURE ISLAND, CALIFORNIA

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-06-D-2201
CTO NO. 0021

FINAL

FINAL STATUS SURVEY REPORT FOR BUILDING 343

October 31, 2008

BUILDING 343
NAVAL STATION TREASURE ISLAND
TREASURE ISLAND, CALIFORNIA

DCN: ECSD-2201-0021-0008

TETRA TECH EC, INC.
1230 Columbia Street, Suite 750
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Cliff Stephan
Technical Lead

Brian Maidrand
Project Manager

Patrick A. Owens
Radiological Affairs Support Office

TETRA TECH EC, INC.

TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. N62473-06-D-2201 (RAC IV)

Document Control No. ECSD-2201-0021-0008

File Code: 5.0

TO: Contracting Officer
Naval Facilities Engineering Command SW
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Building 127, Room 108
1220 Pacific Highway
San Diego, CA 92132-5190

DATE: 11/03/08
CTO: 0021
LOCATION: Treasure Island, CA

FROM: A. N. Bolt

A. N. Bolt, Program Manager

DESCRIPTION: Final Final Status Survey Report for Building 343
October 31, 2008. Building 343

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EXECUTIVE SUMMARY

Building 343 is a one-story metal building located at Naval Station Treasure Island on the eastern portion of Treasure Island in the block bordered by Avenues M and N and 5th and 8th Streets. Naval Station Treasure Island is located in San Francisco Bay approximately midway between the City of San Francisco and the City of Oakland. Building 343 is currently not in use; however, future reuse scenarios are under development. Redevelopment of Naval Station Treasure Island facilities is under the responsibility of the Treasure Island Development Authority. The site is located in parcel number T067, which is slated for mixed use and will likely include residential and community areas.

The Treasure Island Historical Radiation Assessment (Naval Sea Systems Command [NAVSEA], 2006) stated that Building 343 was part of the Radiation Detection, Indication and Computation Maintenance Calibration School from the early 1950s to the 1970s. Activities in Building 343 associated with the school included training personnel in the use and calibration of radiation detection equipment. After the school was closed, Building 343 was still used for storage of radiological sources and for radiological training into the early 1990s. The radiologically impacted classification of Building 343 stems from its use for storage of radioactive sources at various times throughout its use.

Radiological Affairs Support Office's (RASO's) analysis of 172 wipes taken in Building 343 was reported in July 1993 (RASO, 1993a). RASO reported all beta (β) wipes were equal to or less than the lower limit of detection (LLD) for β of 88 disintegrations per minute (dpm), and all but six alpha (α) wipes were equal to or less than the LLD for α of 2.5 dpm. Two of the six α wipes above the LLD were also above release limits. They were located on a counter top in the storeroom (Room 101). Of the remaining four wipes above the LLD (but well below release limits), two were in shelves in the storeroom, one was on the floor in the restroom, and one was in a drawer in the Chemical, Biological, Radiological Defense Laboratory. Follow-up wipes were taken by the Naval Technical Training Center (NTTC) to resolve the six α wipes (RASO, 1993b). NTTC reported that the areas were decontaminated using commercial decontamination spray foam. RASO analyses of the six areas resurveyed by NTTC determined that all six were less than the LLD for both α and β (RASO, 1993c). There were no direct surveys taken, and the wipes were not analyzed for gamma (γ) isotopes. An additional 95 wipes were forwarded to RASO for α, β, and γ analyses of the remainder of Building 343 in July 1993 (RASO, 1993d). RASO reported all β wipes were equal to or less than the LLD for β of 92 dpm, and all but two of the α wipes were less than or equal to the LLD for α of 2.1 dpm. The two α wipes above the LLD were well below the release limits. All wipes were counted as a group for γ in a high purity germanium detector for 50,000 seconds. No γ other than natural background was detected (RASO, 1993e).

Based on the previous activities performed, it was determined that a final status survey was necessary of Building 343, Room 101 to clear the building for unrestricted use. Radium-226 has been identified as the radionuclide of concern.

The *Multi-Agency Radiation Survey and Site Investigation Manual* (Department of Defense et al., 2000), the *Nonparametric Statistical Methodology for the Design and Analysis of the Final Status Decommissioning Survey Guide* (Nuclear Regulatory Commission, 1998), and the *Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions* (Nuclear Regulatory Commission, 1997) were used as guidance in designing and conducting the Final Status Survey at Building 343, Room 101. The room was organized into two survey units, a single Class 1 and a single Class 2 survey unit. Final status survey measurements consisting of fixed static and scan measurements for α, β, and γ radiation, in addition to swipe samples for loose α, β, and γ radiation, were taken during September 2007.

Building structure surfaces were considered acceptable for unrestricted use if the residual radioactivity that was distinguishable from background resulted in a total effective dose equivalent (TEDE) to an average member of the critical group not exceeding 25 millirem per year (mrem/y) as specified in 10 Code of Federal Regulations 20, Section 1402, and the residual radioactivity was reduced to levels as low as is reasonably achievable (ALARA). The critical group refers to the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for the reuse intended for the site. Based on previous comments received from the California Department of Public Health, the following release criteria were established. Building structure surfaces will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation does not exceed the acceptable surface contamination limits from Regulatory Guide 1.86. To ensure ALARA was met, the Navy demonstrated, through radiological surveys and surface swipe sampling, that the radiation levels for structure surfaces did not exceed the smaller value of the acceptable surface contamination limits from Regulatory Guide 1.86 and the screening levels from NUREG/CR-5512, Vols. 2 and 3.

Survey results were statistically analyzed using the Wilcoxon Rank-Sum test to determine if residual radioactivity was present and if conditions within the survey units met the release criteria for unrestricted use. All survey and sample results indicate that Room 101 of Building 343 meets the release criteria and the building can be released to unrestricted use. Furthermore, the survey results were used to show that the calculated dose to the critical group is 0.048 mrem/y, which is less than the 1 mrem/y TEDE release criterion.

1.0 SITE DESCRIPTION

This section includes information on the site location and description, prior historical use, current and future building or land use, and the report objectives.

1.1 SITE LOCATION AND DESCRIPTION

Naval Station Treasure Island (NAVSTA TI) is located on two islands, Treasure Island (TI) and Yerba Buena Island, in San Francisco Bay. NAVSTA TI is located approximately midway between the City of San Francisco and the City of Oakland (Figure 1-1). TI is a man-made island approximately 32.4 square kilometer (km^2) (403 acres) in size connected by a man-made causeway to the 0.69-km^2 (170-acre) Yerba Buena Island (a natural island).

Building 343 is located in the eastern portion of TI, in the block bordered by Avenues M and N and 5th and 8th Streets. Figure 1-2 shows the location of Building 343 on TI.

Building 343 is an approximately 743.2 square meters (m^2) (8,000 square feet [ft^2]), one-story metal building on a concrete foundation located on the eastern part of TI. Room 101, a storeroom is the only potentially impacted room in Building 343, per the NAVSTA TI Historical Radiological Assessment (HRA) (Naval Sea Systems Command [NAVSEA], 2006). Room 101 is located in the northwestern corner of the building and is approximately 83 cubic meters (2,930 cubic feet), measuring roughly 4.88 meters (m) (16 feet [ft]) by 5.67 m (18.6 ft) by 3 m (9.8 ft) high. The room has three doors: an entry from the hall to the south-southeast, a door to adjacent Room 102 to the east-northeast, and a door to the outside of the building to the north-northwest (Figure 1-3).

1.2 PRIOR HISTORICAL USE

The NAVSTA TI HRA (NAVSEA, 2006) states that Building 343 was part of the Radiation, Detection, Indication and Computation (RADIAC) Maintenance Calibration School from the early 1950s to the 1970s. Activities in Building 343 associated with the school included training personnel in the use and calibration of radiation detection equipment. After the school was closed, Building 343 was still used by the Naval Technical Training Center (NTTC) for storage of radiological sources and for radiological training into the early 1990s. The radiologically impacted classification of Building 343 stems from its use for storage of radioactive sources at various times throughout its use. In support of these activities, an inventory of sealed radioactive sources was maintained on site. Building 343 was the last building on site authorized for possession of radioactive materials. The last sources were removed from the building in the early 1990s.

In June 1993, the Navy performed closeout surveys of Building 343 in support of a request to terminate the remaining radioactive material possession license. There were no known leaks in

Building 343; however, swipe testing in support of termination of the active Navy Radioactive Materials Permit showed two out of six elevated alpha (α) radiation wipe readings on a counter top in the storeroom (Room 101).

1.3 CURRENT AND FUTURE BUILDING OR LAND USE

Building 343 is currently not in use and has been unused for many years. Future reuse scenarios are under development; however, the most recent TI Development Authority documents show that Parcel Number T067, where Building 343 is located, will be zoned for residential and community use. Under this redevelopment scenario, it is anticipated that the building will be removed.

1.4 REPORT OBJECTIVES

Detail the procedures and results of the Final Status Survey (FSS) performed for Room 101 of Building 343.

Demonstrate that the estimated residual dose to the critical group (a receptor assumed to occupy a room in the building with contaminated floor, ceiling, and walls for light industrial use, per the guidance in *Technical Basis for Calculating Radiation Doses for the Building Occupancy Scenario Using the Probabilistic RESRAD-BUILD 3.0 Code*) is less than 25 millirems per year (mrem/y).

1.5 REPORT ORGANIZATION

This report is organized as follows:

- Section 1.1 presents the site description.
- Section 2.0 describes the historical site assessment.
- Section 3.0 provides the release criteria.
- Section 4.0 describes the survey design.
- Section 5.0 details the field activities.
- Section 6.0 describes the survey instrumentation.
- Section 7.0 provides the efficiency and detection sensitivity.
- Section 8.0 details the survey procedures and measurement data interpretation.
- Section 9.0 provides the analysis and results.
- Section 10.0 provides the dose modeling.
- Section 11.0 provides the conclusions.
- Section 12.0 provides the references.
- Table and figures follow the text.

Appendices A and B provide survey instrumentation data and instrument calibration documentation. Appendices C through E present field measurements. Appendix F includes materials and equipment release data, and Appendix G is a photographic log of activities at Building 343, Room 101. Appendix H provides dose modeling reports, Appendix I provides background data sheets from the reference area.

2.0 HISTORICAL SITE ASSESSMENT

This section includes information on the previous surveys, Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) (DoD et al., 2000) classification, and the radionuclide of concern (ROC) and radiation characteristics.

2.1 PREVIOUS SURVEYS

The Treasure Island HRA (NAVSEA, 2006) stated that in June 1993, the Navy performed closeout surveys of Building 343 in support of a request to terminate the remaining radioactive material possession license. The license termination request documented the disposition of all sources remaining at Building 343. Swipe surveys of all sources, source containers, and associated rooms in Building 343 were documented. Additional documentation included results from leak tests conducted on α radiation calibration sources stored in Building 343.

Radiological Affairs Support Office's (RASO's) analysis of 172 wipes taken in Building 343 was reported in July 1993 (RASO, 1993a). RASO reported all beta (β) wipes were equal to or less than the lower limit of detection (LLD) for β of 88 disintegrations per minute (dpm), and all, but six, α wipes were equal to or less than the LLD for α of 2.5 dpm. Two of the six α wipes above the LLD were also above release limits. They were located on a counter top in the storeroom (Room 101). Of the remaining four wipes above the LLD (but well below release limits), two were in shelves in the storeroom, one was on the floor in the restroom, and one was in a drawer in the Chemical, Biological, Radiological Defense Laboratory. Follow-up wipes were taken by the NTTC to resolve the six α wipes (RASO, 1993b). NTTC reported that the areas were decontaminated using commercial decontamination spray foam. RASO analyses of the six areas resurveyed by NTTC determined that all six were less than the LLD for both α and β (RASO, 1993c). There were no direct surveys taken and the wipes were not analyzed for gamma (γ) isotopes. An additional 95 wipes were forwarded to RASO for α, β, and γ analyses of the remainder of Building 343 in July 1993 (RASO, 1993d). RASO reported all β wipes were equal to or less than the LLD for β of 92 disintegrations per minute (dpm), and all but two of the α wipes were less than or equal to the LLD for α of 2.1 dpm. The two α wipes above the LLD were well below the release limits. All wipes were counted as a group for γ in a high purity germanium detector for 50,000 seconds. No γ other than natural background was detected (RASO, 1993e).

2.2 RADIONUCLIDE OF CONCERN AND RADIATION CHARACTERISTICS

Historical records indicate the potential presence of radioactive materials within Building 343. Radium-226 (^{226}Ra) is the primary ROC. Table 2-1 lists the ROC, principal types of radiation (α, β, and γ radiation), and associated half-lives identified for measurement purposes.

11.0 CONCLUSION

Building 343, Room 101 was used for storage associated with the RADIAC Maintenance Calibration School on Treasure Island. Building 343 is an approximately 743 m^2 (8,000 ft^2), one-story metal building on a concrete foundation. According to the HRA, Room 101 is the only potentially contaminated room in Building 343. The room is located in the northwestern corner of the building. Room 101 of Building 343 was considered radiologically impacted due to the storage of radioactive materials in the building, known elevated measurements during previous surveys of the room, and other radiological activities at TI. Room 101 was cleared of shelving, counters, and floor tiles and investigated for residual contamination. An FSS was conducted to determine the radiological status of the room and, if appropriate, release the building for unrestricted use.

Surveys of Building 343, Room 101 and associated materials and equipment were conducted in September 2007. The room was organized into two survey units: floor and lower walls (Class 1, Survey Unit 1) and ceiling and upper walls (Class 2, Survey Unit 2). FSS methods included, where appropriate, fixed static and scan surface contamination surveys for α and β radiation, static and scan measurements for γ radiation, exposure rate measurements, and swipe samples for loose α, β, and γ radiation.

Survey results were statistically analyzed using the WRS test to determine if residual radioactivity was present and if conditions within the survey units met the release criteria for unrestricted use. All survey and sample results indicate that Building 343, Room 101 meets the release criteria, and the building can be released to unrestricted use. The statistical test results can be found in Appendix C and D.

The analysis of collected field data shows that the residual radioactivity at Building 343, Room 101 meets the stated release criteria, and that Building 343, Room 101 is ready for unconditional unrestricted use. Dose modeling based on average net concentration level of the ROC resulted in calculated doses of 0.048 or less mrem/y for both survey units, which is less than the 1 mrem/y TEDE release criterion.

4 0 4 8 Miles

Scale: 1" = 8 Miles

N

LEGEND

- 1 STATE HIGHWAY
- 101 US HIGHWAY
- 280 INTERSTATE HIGHWAY
- TREASURE ISLAND
- WATER

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CA

FINAL STATUS SURVEY REPORT
FOR BUILDING 343

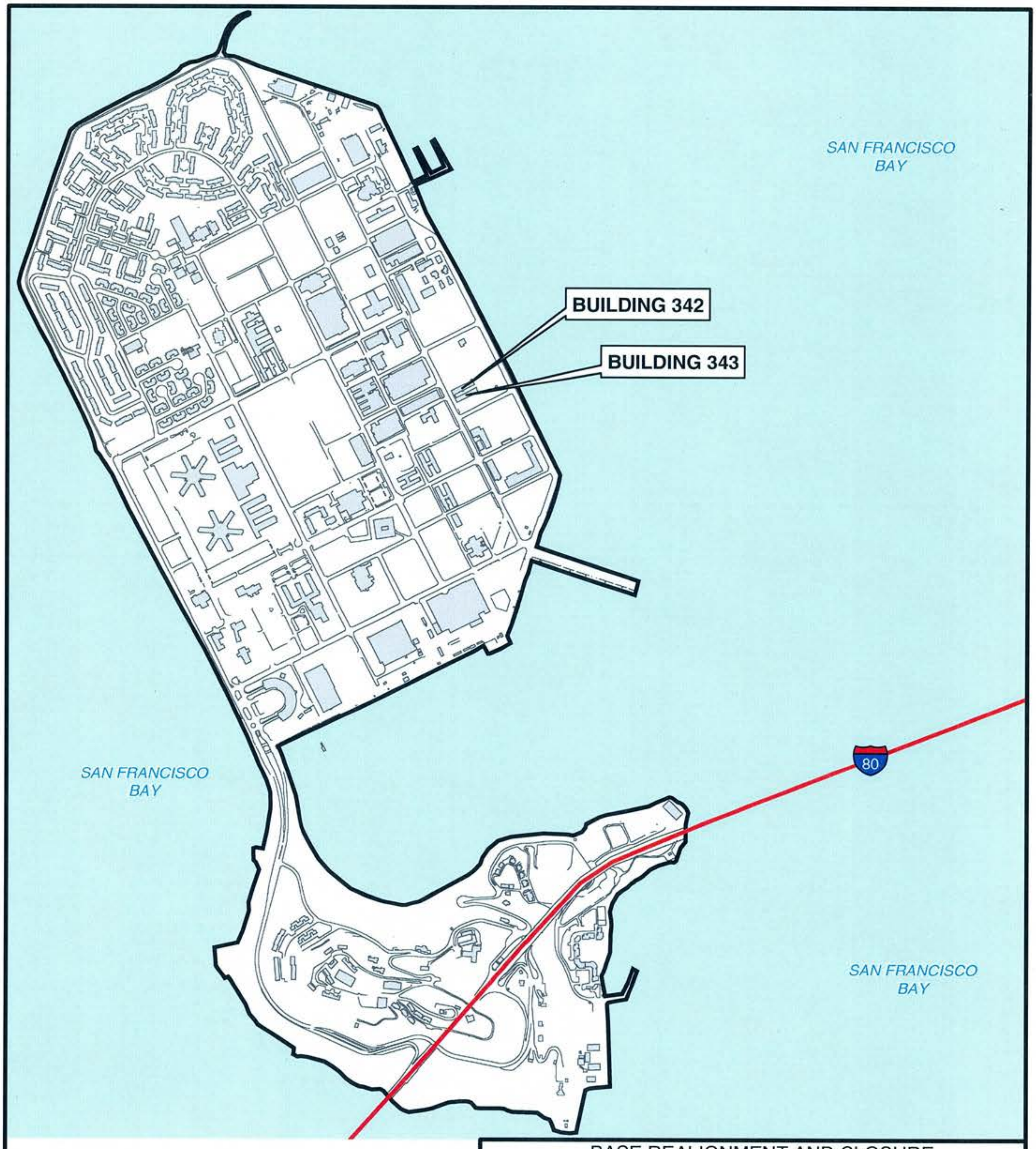
FIGURE 1-1

REGIONAL LOCATION MAP

NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 2
AUTHOR: GFG
DCN: ECSD-2201-0021-0008
FILE NUMBER: 080088R2169.mxd

TETRA TECH EC, INC.



LEGEND

80 INTERSTATE HIGHWAY

NAVAL STATION TREASURE ISLAND BASE BOUNDARY

600 0 600 1,200 Feet

Scale: 1" = 1200'

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CA

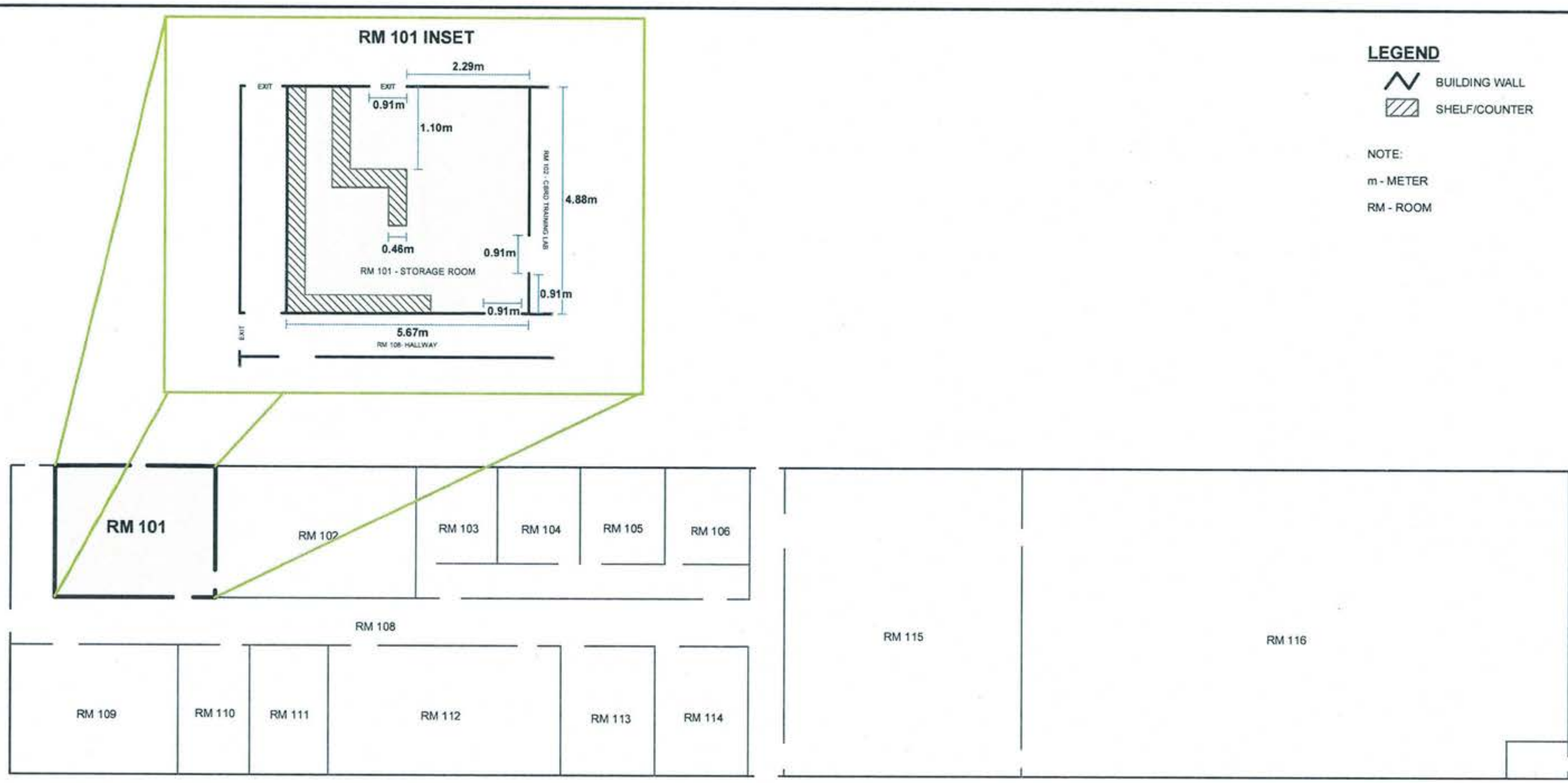
FINAL STATUS SURVEY REPORT
FOR BUILDING 343

FIGURE 1-2

SITE LOCATION MAP
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 2
AUTHOR: GFG
DCN: ECSD-2201-0021-0008
FILE NUMBER: 080088S2172.mxd

TETRA TECH EC, INC.



NOT TO SCALE

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL STATUS SURVEY REPORT
FOR BUILDING 343

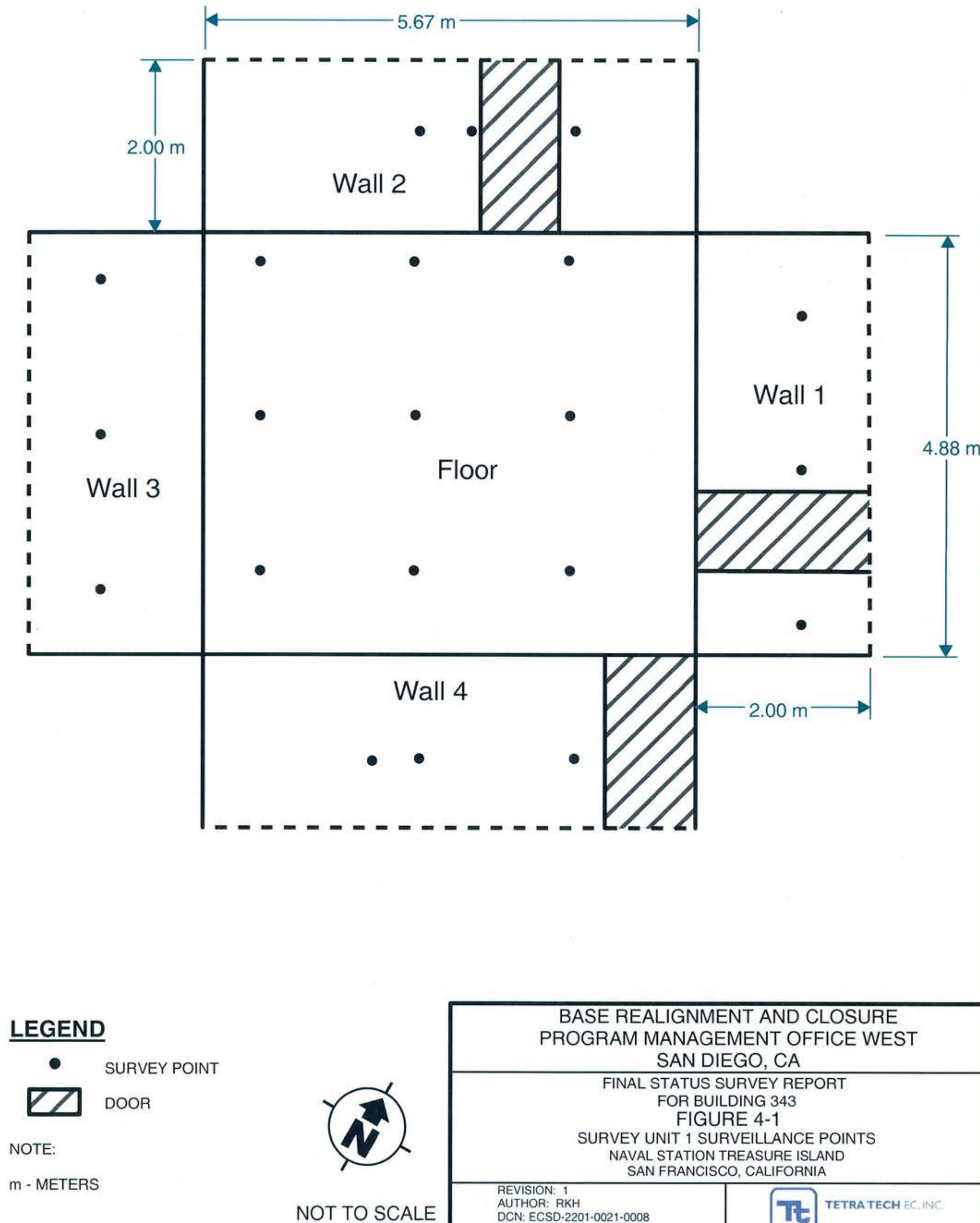
FIGURE 1-3

BUILDING 343 FLOOR PLAN AND RM 101 SCHEMATIC

NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: ECSD-2201-0021-0008
FILE NUMBER: 080088L2177.mxd

TETRA TECH EC, INC.



BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CA

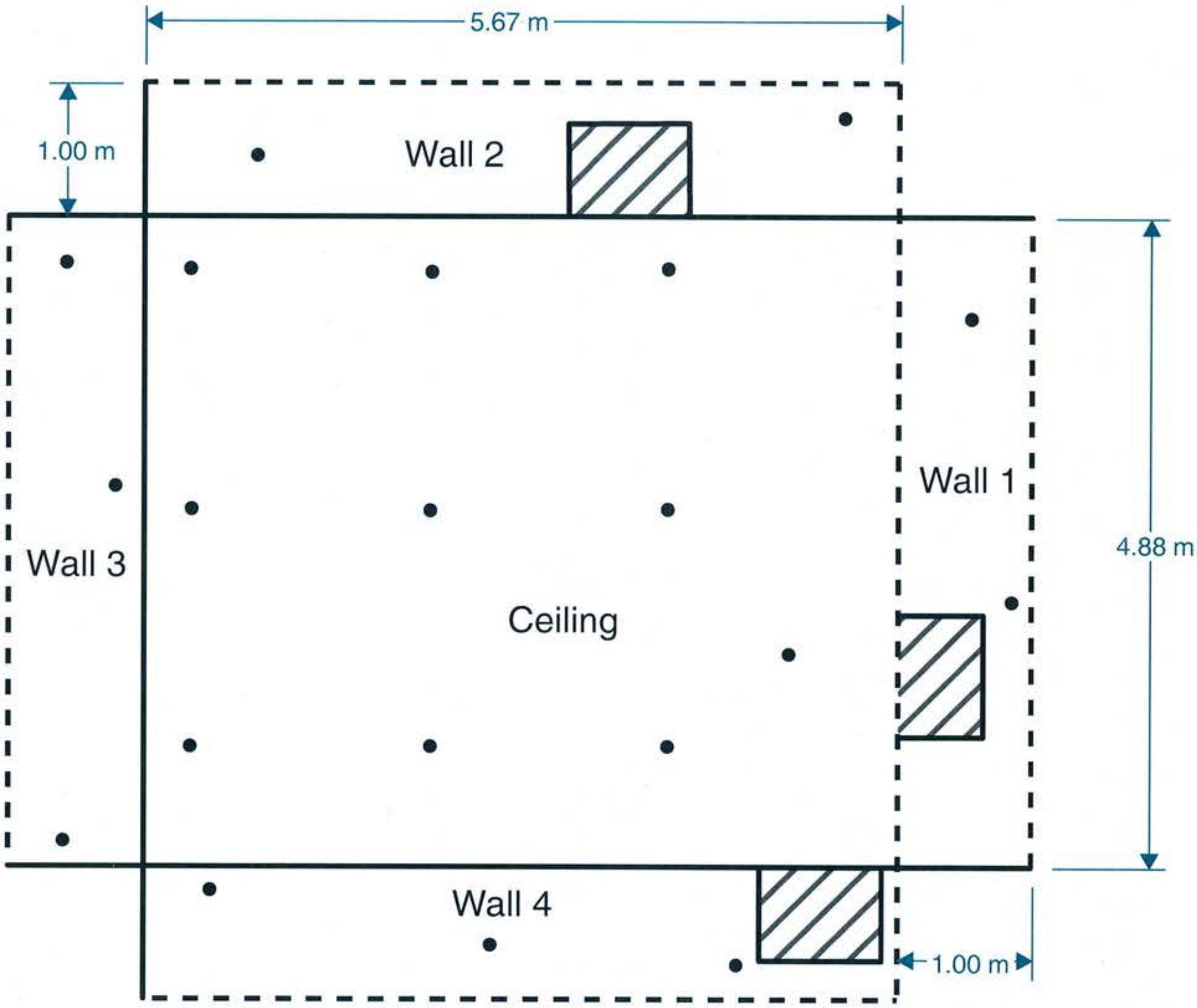
FINAL STATUS SURVEY REPORT
FOR BUILDING 343

FIGURE 4-1

SURVEY UNIT 1 SURVEILLANCE POINTS
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 1
AUTHOR: RKH
DCN: ECSD-2201-0021-0008
FILE NUMBER: 080088L2214.mxd

TETRA TECH EC, INC.



LEGEND

- SURVEY POINT
- DOOR

NOTE:

m - METERS

NOT TO SCALE

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CA

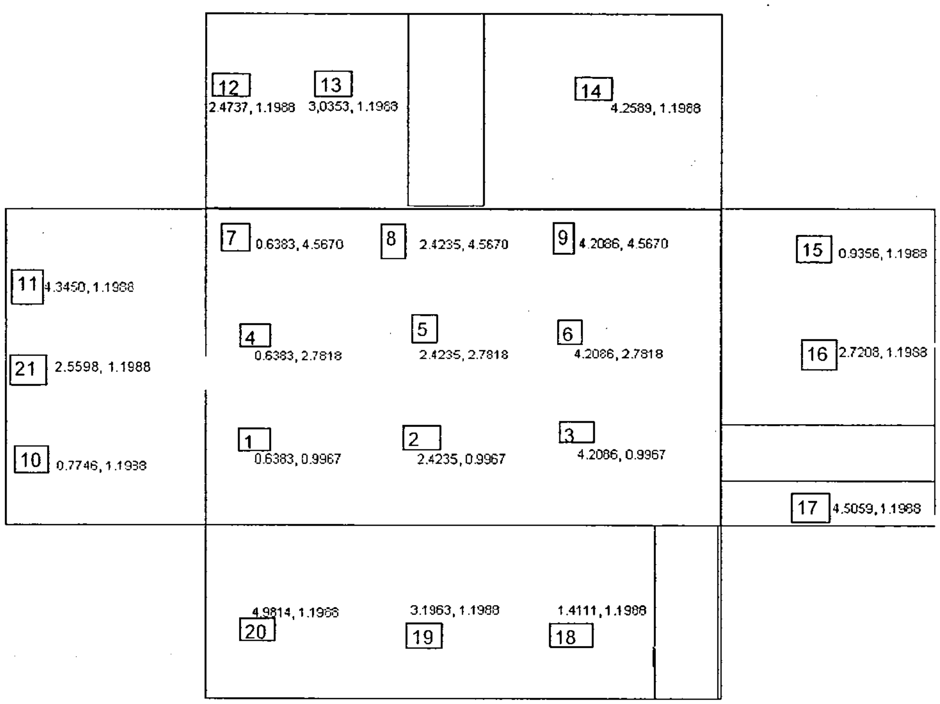
FINAL STATUS SURVEY REPORT
FOR BUILDING 343
FIGURE 4-2
SURVEY UNIT 2 SURVEILLANCE POINTS
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: RKH
DCN: ECSD-2201-0021-0008
FILE NUMBER: 080088L2215.mxd

TETRA TECH EC, INC.

RADIATION/CONTAMINATION SURVEY FORM

Date: 9/19/2007 Time: 12:30	INSTRUMENTATION USED						
	Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm²)	Background + (dpm/100cm²)
Survey Number: RSRS-Bldg-343-MRSM-091907							
Location: Building 343	2360 43-68	177117 95526	8/28/2008	α 29.50% βγ 34.55%	α 7.38% βγ 8.64%	α 36.31 βγ 207.94	α 3.50 βγ 379.48
Surveyor: S Rolfe/T Standfuss	2929	182585	9/6/2008	α 66.90% βγ 54.20%	α 16.73% βγ 13.55%	α 3.29 βγ 39.78	α 1.20 βγ 432.92
Reviewed By: B Henderson	2350-1 44-10	126182 230620	8/28/2008				4.2098 Kcpm
Isotopes of Concern: ^{226}Ra							
Survey Type: Final Status Survey	2360 Static Count Time: 2 Minutes				2350 Static Count Time: 1 Minute		
Description of survey: BLDG 343 Floor and Walls							



Comments:

2350 - Scan range 3.2 - 4.4 Kcpm.

Scan Ranges 0 - 2 cpm alpha and 140-250 cpm beta.

Smears and statics taken at survey points labeled on map.

- (#) denotes swipe location or fixed α/β readings
- # denotes G/A radiation readings
- #/# denotes contact / 1 meter radiation readings.
- * denotes highest radiation reading on contact
- [#] denotes smear and static locations
- Δ denotes large area masslinn wipe
- \+ Unless Otherwise Noted
- All readings in μR/hr unless otherwise noted
- K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: RSRS-Bldg-343-MRSM-091907	
SURVEYOR: S Rolfe/T Standfuss	LOCATION: Building 343

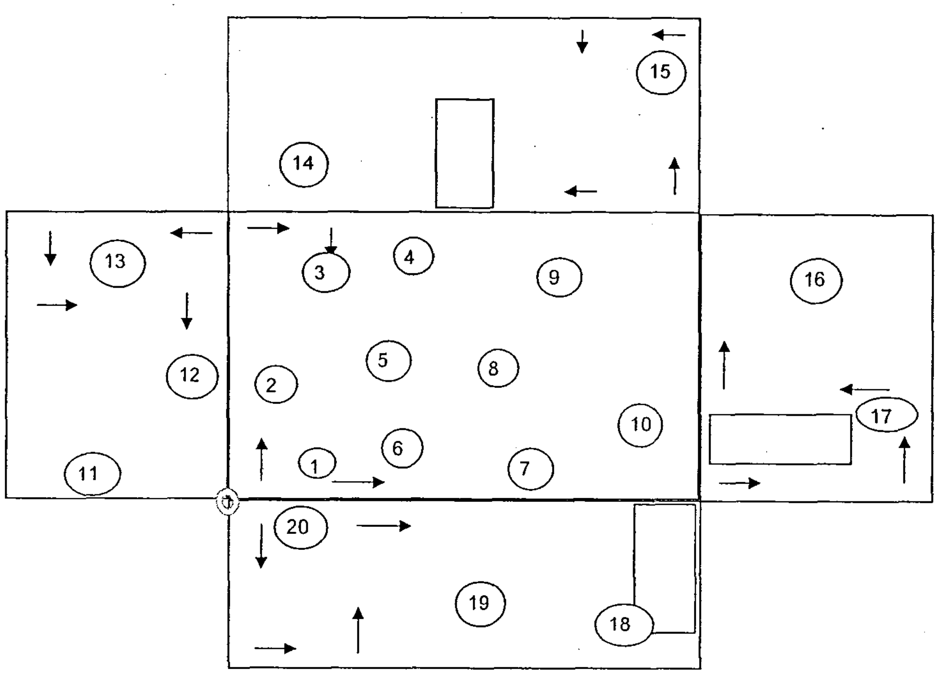
Location	Exposure Rate (μR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1	4.6		4391	7.26	663.40	-1.20	-86.05	
2	4.5		4290	7.26	704.75	-1.20	24.65	
3	4.7		4490	1.88	631.25	-1.20	-61.45	
4	4.5		4341	1.88	654.22	0.80	-2.41	
5	4.4		4246	-3.50	631.25	-1.20	-78.67	
6	4.4		4203	1.88	516.39	0.80	-44.23	
7	4.3		4090	1.88	576.11	-1.20	-29.47	
8	4.4		4185	-3.50	585.30	0.80	-46.69	
9	4.3		4075	1.88	553.14	-1.20	-22.09	
10	4		3785	1.88	309.65	-1.20	-29.47	
11	3.9		3764	12.64	217.77	-1.20	-58.99	
12	4.1		3905	-3.50	125.88	-1.20	-73.75	
13	4.3		4085	1.88	360.19	-1.20	17.27	
14	3.7		3541	7.26	410.72	-1.20	-24.55	
15	4		3792	1.88	199.39	-1.20	0.05	
16	4		3797	1.88	351.00	0.80	-66.37	
17	4.1		3881	-3.50	305.06	2.79	-7.33	
18	4.3		4107	-3.50	488.82	0.80	-17.17	
19	4.3		4089	1.88	438.29	-1.20	17.27	
20	4.1		3940	-3.50	410.72	-1.20	-24.55	
21	4.1		3876	-3.50	383.16	0.80	-14.71	

Reviewer	Date: 10/01/2007	RSO/RTM	Date: 10/02/2007
[signature]	Time: 12:00	[signature]	Time: 12:00

RADIATION/CONTAMINATION SURVEY FORM

Date: Time: 9/25/2007 14:30	INSTRUMENTATION USED						
	Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
Survey Number: RSRS-Bldg-343-Class-2-092507							
Location: Building 343	2360 43-68	177117 95526	8/28/2008	α 29.50% βγ 34.55%	α 7.38% βγ 8.64%	α 36.31 βγ 207.94	α 3.50 βγ 379.48
Surveyor: S Rolfe/T Standfuss	2929	182585	4/16/2008	α 66.90% βγ 54.20%	α 16.73% βγ 13.55%	α 3.29 βγ 39.78	α 1.20 βγ 432.92
Reviewed By: B Henderson	2350-1 44-10	126182 230620	8/28/2008				4.2098 Kcpm
Isotopes of Concern: ^{226}Ra							
Survey Type: Building Release	2360 Static Count Time: 2 Minutes				2350 Static Count Time: 1 Minute		

Description of survey: BLDG 343 Walls and Celing



Comments:

50% Scan on Celing and walls above 2 meters.

Static counts and smeard taken a highest reading found during scan.

(#)	denotes swipe location or fixed α/β readings
#	denotes G/A radiation readings
# / #	denotes contact / 1 meter radiation readings.
*	denotes highest radiation reading on contact
[#]	denotes smear and static locations
Δ	denotes large area masslinn wipe
+	Unless Otherwise Noted
	All readings in μR/hr unless otherwise noted
	K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: RSRS-Bldg-343-Class-2-092507

SURVEYOR: S Rolfe/T Standfuss

LOCATION: Building 343

Location	Exposure Rate (μR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
1	3.7		3521	1.88	658.81	0.80	-4.87	
2	3.9		3677	7.26	906.90	4.78	-9.79	
3	3.8		3643	-3.50	645.03	0.80	-29.47	
4	3.7		3499	1.88	837.98	-1.20	-27.01	
5	3.7		3570	1.88	645.03	0.80	-49.15	
6	3.7		3520	1.88	796.64	-1.20	29.57	
7	3.8		3657	-3.50	640.43	0.80	-68.83	
8	4.1		3878	-3.50	755.29	-1.20	7.43	
9	3.7		3579	-3.50	828.80	-1.20	54.17	
10	3.8		3638	1.88	773.67	0.80	61.55	
11	3.6		3448	1.88	746.10	-1.20	127.97	
12	3.8		3628	1.88	778.26	-1.20	49.25	
13	4.1		3889	1.88	755.29	0.80	9.89	
14	4.1		3900	-3.50	815.01	0.80	17.27	
15	3.9		3687	7.26	874.74	-1.20	83.69	
16	3.9		3743	1.88	851.77	0.80	113.21	
17	3.7		3527	1.88	727.72	-1.20	98.45	
18	3.9		3692	-3.50	704.75	2.79	39.41	
19	3.6		3478	-3.50	796.64	0.80	83.69	
20	3.7		3562	-3.50	805.83	0.80	108.29	

Reviewer	Date: 10/01/2007	RSO/RTM	Date: 10/02/2007
Brian Hedman	Time: 12:00	Doyle E. Delong	Time: 12:00

APPENDIX F

MATERIALS AND EQUIPMENT RELEASE DATA

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RADIATION/CONTAMINATION SURVEY FORM

Date: Time: 9/14/2007 12:30	INSTRUMENTATION USED						
	Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
Survey Number: RSRS-Bldg-343Shelves-091407							
Location: Building 343	2360 43-68	177117 190328	8/28/2008	α 29.50% βγ 34.55%	α 7.38% βγ 8.64%	α 38.52 βγ 272.09	α 4.3 βγ 671.7
Surveyor: S Rolfe / T Standfuss	2929	182585	9/6/2008	α 66.90% βγ 54.20%	α 16.73% βγ 13.55%	α 9.83 βγ 123.05	α 0.6 βγ 436.9
Reviewed By:	2350-1 44-10	126182 230620	8/28/2008				3933.1 cpm
Isotopes of Concern: ^{226}Ra							
Survey Type: Shelves Release	2360 Static Count Time: 2 Minutes				2350 Static Count Time: 1 Minute		

Description of survey: Wood Shelves

Comments:

All LAW's were ≤ background α β

Floor Scan - Scan Ranges - 0-3 cpm alpha and 80-100 cpm beta.

2350 - Scan range 3.5 - 4.2 Kcpm.

Static counts were taken at smear locations.

SEE ADDITIONAL PHOTOS ON PHOTO PAGE

denotes swipe location or fixed α/β readings on backside

(#) denotes swipe location or fixed α/β readings

# denotes G/A radiation readings

#/# denotes contact / 1 meter radiation readings.

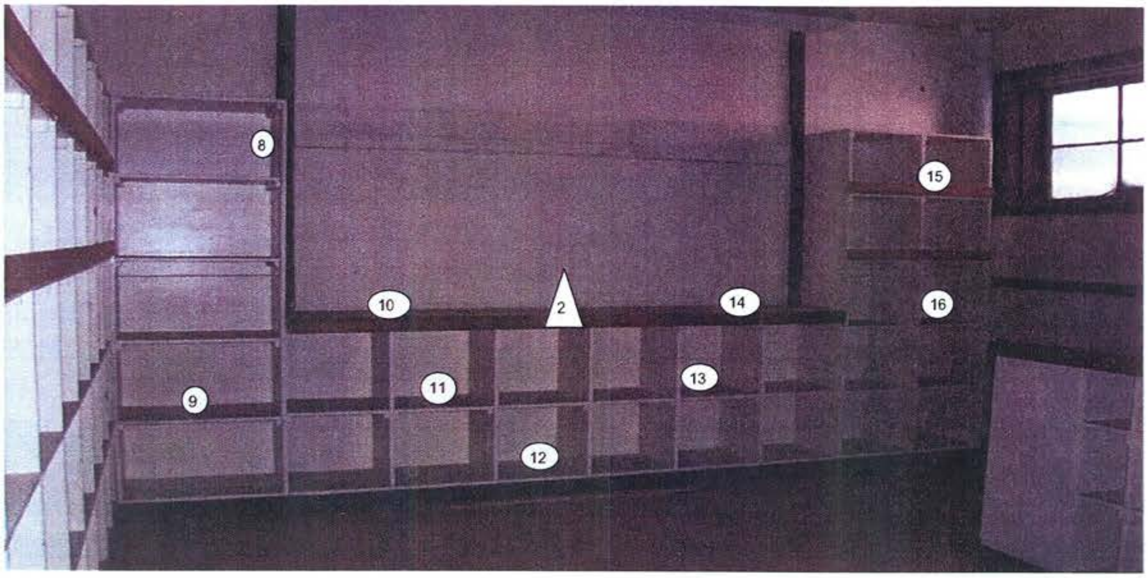
* denotes highest radiation reading on contact

Δ denotes large area masslinn wipe

\+ Unless Otherwise Noted

All readings in μR/hr unless otherwise noted

K = 1000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2
14
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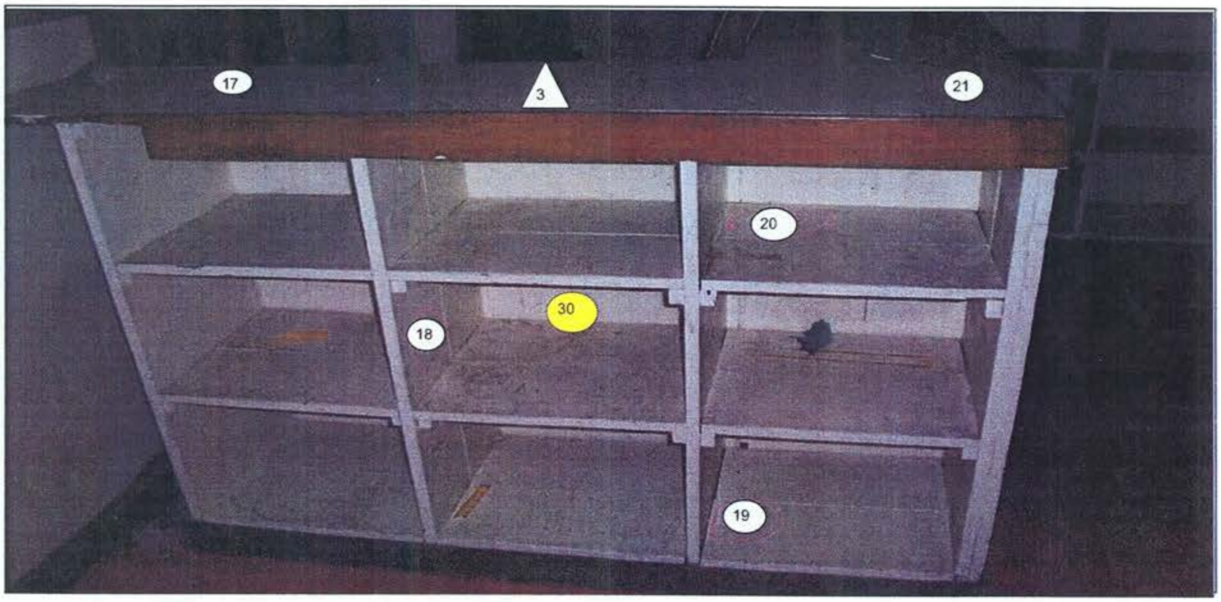
11
13
9
12

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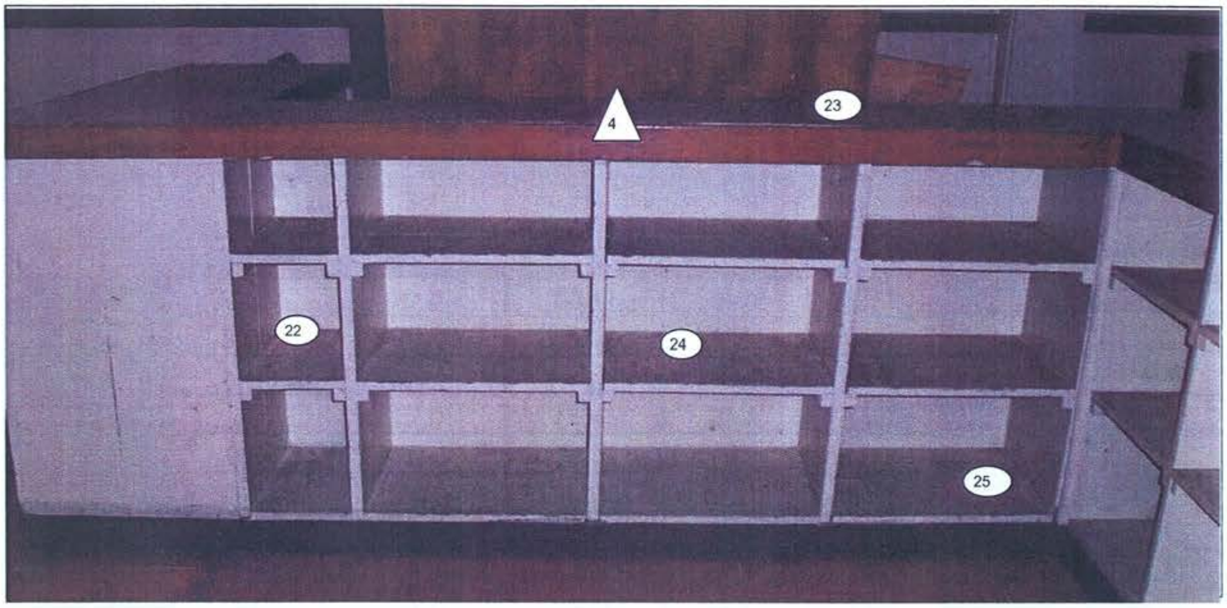
18
19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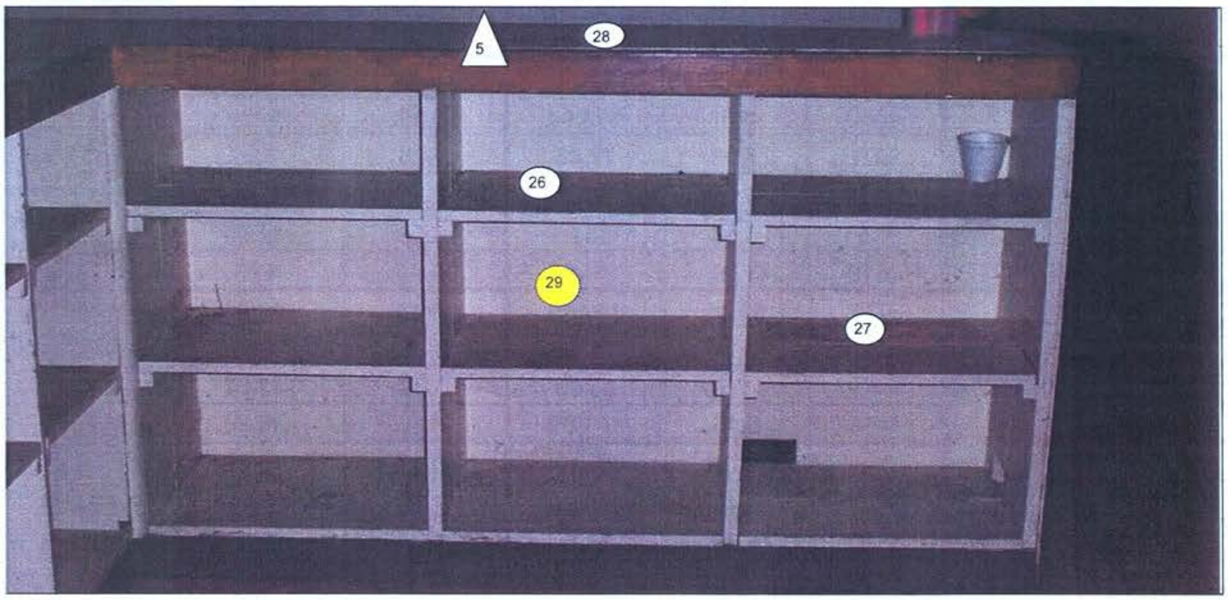

5
28
26
29
27

SURVEY NUMBER: RSRS-Bldg-343Shelves-091407

SURVEYOR: S Rolfe / T Standfuss | LOCATION: Building 343

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
1			3815	6.46	95.56	-0.15	-13.28	
2			3540	22.60	67.99	0.35	-13.28	
3			4147	1.08	113.94	0.35	-11.44	
4			3847	6.46	58.81	-0.15	0.25	
5			4171	1.08	-5.51	0.85	-16.97	
6			4085	1.08	159.88	0.35	-4.67	
7			3746	6.46	26.65	-0.15	12.55	
8			3702	1.08	35.83	-0.15	-12.67	
9			3841	11.84	49.62	-0.15	1.48	
10			3632	17.22	12.86	-0.15	-4.67	
11			3986	11.84	31.24	-0.15	-4.06	
12			4062	-4.30	113.94	0.35	6.40	
13			3676	1.08	17.46	0.35	-0.37	
14			3577	6.46	-88.21	0.85	-5.29	
15			3626	6.46	-33.08	0.35	-13.90	
16			3619	1.08	141.50	-0.15	4.55	
17			3752	11.84	100.15	-0.15	-10.21	
18			3873	-4.30	12.86	0.35	4.55	
19			4179	11.84	45.02	0.35	-12.67	
20			3818	6.46	141.50	-0.15	-16.36	
21			3796	-4.30	45.02	-0.15	-12.05	
22			3861	6.46	150.69	1.35	10.09	
23			3685	1.08	-19.30	-0.15	8.24	
24			4032	6.46	150.69	-0.15	6.40	
25			4063	1.08	77.18	-0.15	-8.98	
26			3848	11.84	45.02	-0.15	-2.21	
27			3941	11.84	164.47	0.35	-2.21	
28			3743	-4.30	205.82	0.85	-14.51	
29			3885	1.08	224.20	-0.15	10.09	
30			3880	11.84	67.99	0.35	-14.51	

Reviewer	Date:	RSO/RTM	Date:
	Time:		Time:

BACKGROUND DETERMINATION DATA SHEET

Instrument Model:	2360	Instrument Serial No. :177117	
Calibration Due Date:	8/28/2008	Detector Model:	43-68
Todays Date:9/12/2007		WOOD	
Data and Calculations Reviewed By:		Daryl E. DeLong	
☐ Alpha **(Check One)**			
Count Number	Gross Count	Count Time	CPM
1	0	2	0
2	0	2	0
3	0	2	0
4	1	2	0.5
5	1	2	0.5
6	2	2	1
7	0	2	0
8	2	2	1
9	1	2	0.5
10	1	2	0.5
Total = sum(X)			4
Mean Count = sum(X)/10			0.4
Standard Deviation (σ)			0.39
Background Count Rate = Mean	0.4	CPM x 2σ	1.19
Calculations Completed By:			Date: 9/12/2007
Data and Calculations Reviewed	Brian Hedden		Date: 9/12/2007

BACKGROUND DETERMINATION DATA SHEET

Instrument Model:	2350	Instrument Serial No. :126182	
Calibration Due Date:	8/28/2008	Detector Model:	44-10
Todays Date:9/12/2007		WOOD	
Data and Calculations Reviewed By:		Dayl E. Delong	
☐ Beta-Gamma (Check One)			

Count Number	Gross Count	Count Time	CPM
1	3776	1	3776
2	3625	1	3625
3	3667	1	3667
4	3769	1	3769
5	3765	1	3765
6	3730	1	3730
7	3893	1	3893
8	3807	1	3807
9	4258	1	4258
10	4067	1	4067
11	3918	1	3918
12	4375	1	4375
13	4261	1	4261
14	4191	1	4191
15	3824	1	3824
16	4033	1	4033
17	3845	1	3845
18	3987	1	3987
19	3810	1	3810
20	4061	1	4061
Total = sum(X)			78662
Mean Count = sum(X)/20			3933.1
Standard Deviation (σ)			212.93
Background Count Rate = Mean	3933.1	CPM x 2σ	4358.96
Calculations Completed By:			Date: 9/12/2007
Data and Calculations Reviewed	Bran Hoden		Date: 9/12/2007

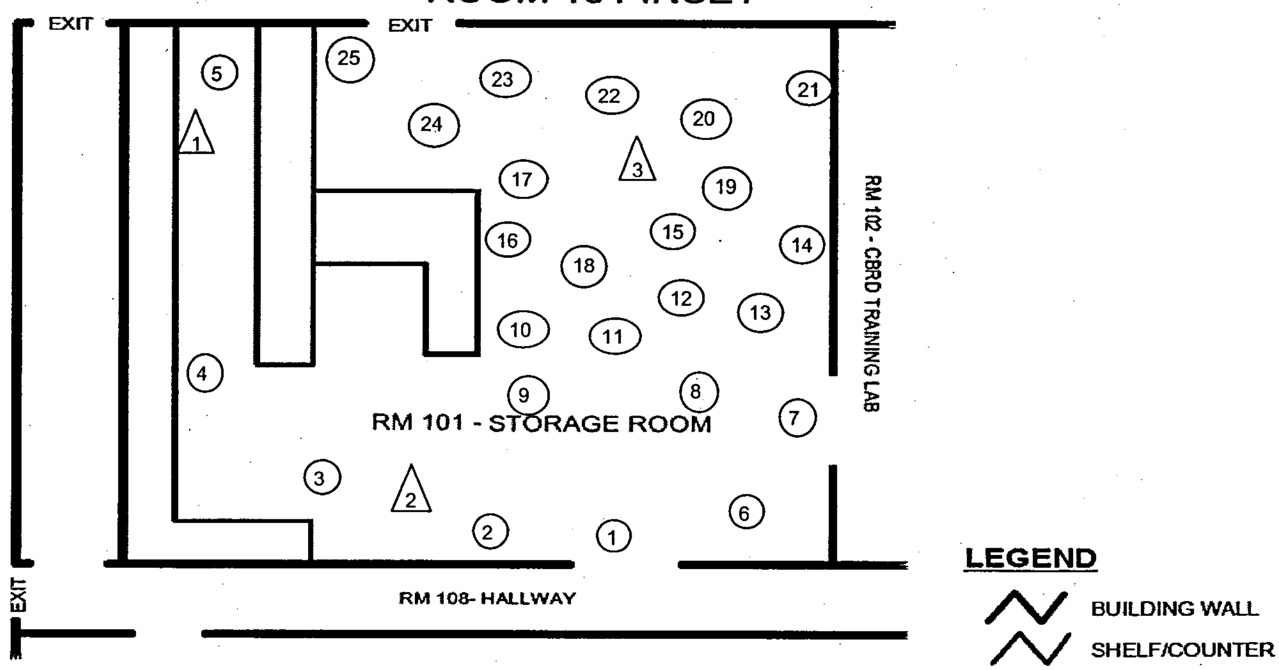
BACKGROUND DETERMINATION DATA SHEET

Instrument Model:	2360	Instrument Serial No. : 177117	
Calibration Due Date:	8/28/2008	Detector Model:	43-68
Todays Date:9/12/2007		WOOD	
Data and Calculations Reviewed By:			
☐ BETA **(Check One)**			
Count Number	Gross Count	Count Time	CPM
1	78	2	39
2	57	2	28.5
3	71	2	35.5
4	70	2	35
5	76	2	38
6	81	2	40.5
7	78	2	39
8	68	2	34
9	72	2	36
10	80	2	40
Total = sum(X)			365.5
Mean Count = sum(X)/20			36.55
Standard Deviation (σ)			3.60
Background Count Rate = Mean	36.55	CPM x 2σ	43.75
Calculations Completed By:			Date: 9/12/2007
Data and Calculations Reviewed			Date: 9/12/2007

RADIATION/CONTAMINATION SURVEY FORM

Date: Time: 9/14/2007 12:30	Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA+ (dpm/100cm^2)	Background+ (dpm/100cm^2)
Survey Number: RSRS-Bldg343Tile-091407							
Location: Building 343	2360 43-68	177117 190328	8/28/2008	α 29.50% βγ 34.55%	α 7.38% βγ 8.64%	α 36.31 βγ 288.36	α 3.50 βγ 758.96
Surveyor: S Rolfe / T Standfuss	2929	182585	9/6/2008	α 66.90% βγ 54.20%	α 16.73% βγ 13.55%	α 9.83 βγ 123.05	α 0.60 βγ 436.90
Reviewed By: B Henderson	2350-1 44-10	126182 230620	8/28/2008				4209.8 cpm
Isotopes of Concern: ^{226}Ra							
Survey Type: Tile Release	2360 Static Count Time: 2 Minutes				2350 Static Count Time: 1 Minute		
Description of survey: Tile Floor							

ROOM 101 INSET



Comments:

All LAW's were ≤ background α β (indicated by triangle)

Floor Scan 0-3 cpm Alpha and 80-100 cpm beta

2350 - Scan range 3.2 - 4.4 Kcpm.

Smear numbers 1 - 42 are taken on inside walls of Building 343 Room 101.

(#) denotes swipe location or fixed α/β readings
# denotes G/A radiation readings
#/# denotes contact / 1 meter radiation readings.
* denotes highest radiation reading on contact
Δ denotes large area masslinn wipe
+ Unless Otherwise Noted
All readings in μR/hr unless otherwise noted
K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: RSRS-Bldg343Tile-091407

SURVEYOR: S Rolfe / T Standfuss | LOCATION: Building 343

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gross Gamma (cpm)	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1			4348	7.26	-65.24	-0.15	-22.51	
2			4289	-3.50	-37.67	-0.15	5.17	
3			4159	7.26	-14.70	-0.15	-16.36	
4			4121	12.64	-92.80	0.35	-1.60	
5			4112	7.26	-101.99	-0.15	-20.66	
6			4337	1.88	-74.43	0.35	-12.05	
7			4254	1.88	-106.59	-0.15	-8.36	
8			4194	7.26	-184.69	0.35	-12.67	
9			4191	1.88	-138.75	-0.15	-6.52	
10			4347	23.41	-69.83	-0.15	-8.36	
11			4499	1.88	-120.37	-0.15	-15.74	
12			4068	1.88	-106.59	-0.15	-19.43	
13			4113	1.88	-115.77	-0.15	3.32	
14			4412	-3.50	-92.80	-0.15	-7.13	
15			4243	12.64	-14.70	-0.15	-0.98	
16			4419	-3.50	-83.61	0.35	-17.59	
17			4257	7.26	-69.83	0.85	-2.83	
18			4135	-3.50	-120.37	0.35	-5.29	
19			4115	-3.50	-189.28	-0.15	3.32	
20			4314	1.88	-69.83	-0.15	-7.13	
21			4317	1.88	-129.56	-0.15	-15.13	
22			4263	1.88	-101.99	0.35	-4.67	
23			4084	-3.50	-193.88	-0.15	-13.90	
24			3897	-3.50	-134.15	0.85	-3.44	
25			4382	7.26	-56.05	-0.15	-2.83	

Reviewer	Date:	RSO/RTM	Date:
	Time:		Time:

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-06-D-2201
CTO NO. 0021

FINAL

FINAL STATUS SURVEY REPORT FOR BUILDING 344

October 31, 2008

DCN: ECSD-2201-0021-0010

BUILDING 344
NAVAL STATION TREASURE ISLAND
TREASURE ISLAND, CALIFORNIA

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-06-D-2201
CTO NO. 0021

FINAL

FINAL STATUS SURVEY REPORT FOR BUILDING 344

October 31, 2008

BUILDING 344
NAVAL STATION TREASURE ISLAND
TREASURE ISLAND, CALIFORNIA

DCN: ECSD-2201-0021-0010

TETRA TECH EC, INC.
1230 Columbia Street, Suite 750
San Diego, California 92101-8536

Cliff Stephan
Technical Lead

Brian Maidrand
Project Manager

Patrick A. Owens
Radiological Affairs Support Office

TETRA TECH EC, INC.

TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. N62473-06-D-2201 (RAC IV)

Document Control No. ECSD-2201-0021-0010

File Code: 5.0

TO: Contracting Officer
Naval Facilities Engineering Command SW
Ms. Beatrice Appling, AQE.BA
Building 127, Room 108
1220 Pacific Highway
San Diego, CA 92132-5190

DATE: 11/03/08
CTO: 0021
LOCATION: Treasure Island, CA

FROM: A. N. Bolt

A. N. Bolt, Program Manager

DESCRIPTION: Final Final Status Survey Report for Building 344
October 31, 2008. Building 344

TYPE: ☐ Contract/Deliverable ☒ CTO Deliverable ☐ Notification ☐ Other

VERSION: Final (e.g. Draft, Draft Final, Final, etc.)

REVISION #: N/A

ADMIN RECORD: Yes ☒ No ☐ Category ☐ Confidential ☐
(PM to Identify)

SCHEDULED DELIVERY DATE: 10/31/08 ACTUAL DELIVERY DATE: 11/03/08

NUMBER OF COPIES SUBMITTED: O/9C/6E Copy of SAP to N. Ancog ☒

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FIGURES

APPENDICES

EXECUTIVE SUMMARY

Building 344 is a concrete storage vault located at Naval Station Treasure Island on the eastern portion of Treasure Island in the block bordered by Avenues M and N, and 5th and 8th Streets. Naval Station Treasure Island is located in San Francisco Bay, approximately midway between the City of San Francisco and the City of Oakland. Building 344 is currently not in use; however, future reuse scenarios are under development. Redevelopment of Naval Station Treasure Island facilities is under the responsibility of the Treasure Island Development Authority. The site is located in parcel number T067, which is slated for mixed use and will likely include residential and community areas.

The Treasure Island Historical Radiation Assessment (Naval Sea Systems Command, 2006) stated that Building 344 was used for storage associated with the Radiation Detection, Indication and Computation Maintenance Calibration School on Treasure Island. The radiologically impacted classification of Building 344 stems from its use for storage of radioactive sources between the early 1950s and 1991. A variety of sealed radioactive sources were stored in Building 344. In March of 1988, a scheduled routine beta-gamma wipe survey of the waste containers inside the storage vault revealed low levels of loose contamination on the inside of the waste containers. Only wipe surveys were feasible in this location because the numerous sources maintained in the vault made direct radiation surveys impossible. After the wipes were removed from the vault and counted, revealing the low levels of contamination, an investigation quickly identified the source to be the mini-generator kit located on a shelf near the waste containers. Results of surveys of the shelf containing the mini-generator kit, all other shelves in the vault, and the floor of the vault were all negative. No spread of radioactivity was found outside of the mini-generator kit and the waste containers.

Cleanup of the low levels of contamination involved packaging and off-site disposal of the mini-generator kit and the waste containers. Arrangements for off-site disposal were made by Naval Support Center Oakland.

Based on the activities performed at Naval Station Treasure Island, cesium-137 has been identified as the radionuclide of concern for Building 344. Previous surveys of Building 344 including routine surveys in the late 1980s that located the contaminated waste containers. Closeout surveys in the early 1990s in support of removal of Building 344's authorization for storage of radioactive materials did not reveal residual radioactivity in the building.

Building structure surfaces were considered acceptable for unrestricted use if the residual radioactivity that was distinguishable from background resulted in a total effective dose equivalent (TEDE) to an average member of the critical group not exceeding 25 millirems per year (mrem/y) as specified in 10 Code of Federal Regulations, Section 1402, and the residual radioactivity was reduced to levels as low as reasonably achievable (ALARA). The critical

group refers to the group of individuals reasonably expected to receive the greatest exposure to residual radioactivity for the reuse intended for the site. Based on previous comments received from the California Department of Public Health, the following release criteria were established. Building structure surfaces will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation does not exceed the acceptable surface contamination limits from Atomic Energy Commission Regulatory Guide 1.86 (REG GUIDE 1.86). To ensure ALARA was met, the Navy demonstrated, through radiological surveys and surface swipe sampling, that the radiation levels for structure surfaces did not exceed the lesser value of the acceptable surface contamination limits from REG GUIDE 1.86 and the screening levels from the Nuclear Regulatory Commission (NRC) Nuclear Regulatory Guide (NUREG)/CR-5512 (NRC, 2001).

The following resources were used as guidance in designing and conducting the Final Status Survey at Building 344:

- Multi-Agency Radiation Survey and Site Investigation Manual (NUREG-1575) (Department of Defense et al., 2000)
- Nonparametric Statistical Methodology for the Design and Analysis of the Final Status Decommissioning Survey (NUREG-1505) (NRC, 1998)
- Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions (NUREG/CR-1507) (NRC, 1997)

Survey results were statistically analyzed using the paired t-test and the Wilcoxon Rank-Sum test to determine if residual radioactivity was present and if conditions within the survey units met the release criteria for unrestricted use. All survey and sample results indicate that Building 344 meets the release criteria and the building can be released to unrestricted use. Furthermore, the survey results were used to show that the calculated dose to the critical group is 0.009 mrem/y, which is less than the 1 mrem/y TEDE release criterion.

1.0 SITE DESCRIPTION

This section includes information on the site location and description, prior historical use, current and future building or land use, and the report objectives.

1.1 SITE LOCATION AND DESCRIPTION

Naval Station Treasure Island (NAVSTA TI) is located on two islands, Treasure Island (TI) and Yerba Buena Island, in San Francisco Bay. NAVSTA TI is located approximately midway between the City of San Francisco and the City of Oakland (Figure 1-1). TI is a man-made island approximately 403 acres in size connected by a man-made causeway to the 170-acre Yerba Buena Island, which is a natural island.

Building 344 is located in the eastern portion of TI in the block bordered by Avenues M and N and 5th and 8th Streets. Figure 1-2 shows the location of Building 344 on TI.

The building covers approximately 23.23 square meters (m^2) (250 square feet [ft^2]) measuring roughly 4.57 meters (m) by 5.18 m (15 feet [ft] by 17 ft) and was built in 1951. Walls and ceilings are 0.36 m (1.2 ft) thick reinforced concrete, and the floor is approximately 1.52 m (5 ft) below grade. Access is through a single 1.27 centimeter (cm) (0.5 inches [in]) thick steel door. Figure 1-3 shows the layout of Building 344.

1.2 PRIOR HISTORICAL USE

The NAVSTA TI Historical Radiological Assessment (HRA) (Naval Sea Systems Command [NAVSEA], 2006) states that Building 344 was part of the Radiation Detection, Indication and Computation (RADIAC) Maintenance Calibration School. Activities associated with the school included training personnel in the use and calibration of radiation detection equipment. In support of these activities, an inventory of sealed radioactive sources was maintained on site. Building 344 was used for storage of sources between the early 1950s and 1991.

During a routine survey in March 1988, two contaminated waste containers were found in the building. Follow-on investigations identified the source of the contamination to be a cesium/barium mini-generator kit. The kit contained small vials labeled "Cesium 137 (^{137}Cs)/Barium 137" and "Tin 113/Indium 113." Swipe surveys of the kit's storage location and surrounding areas were taken, but no contamination was indicated. No direct radiation readings could be taken for confirmatory surveys due to the presence of other sources in the vault. The kit and contaminated containers were secured and disposed of off-site at a licensed disposal facility.

1.3 CURRENT AND FUTURE BUILDING OR LAND USE

Building 344 is currently not in use and has not been used for many years. Future reuse scenarios are under development; however, the most recent TI Development Authority documents show that parcel number T067, which is where Building 344 is located, will be zoned for residential and community use. Under this redevelopment scenario, it is anticipated that the building would be removed.

1.4 REPORT OBJECTIVES

The objectives of this report are the following:

- Detail the procedures and results of the Final Status Survey (FSS) performed for Building 344.
- Demonstrate that the estimated residual dose to the critical group is less than 1 millirem per year (mrem/y). The critical group is defined to be a receptor assumed to occupy a room in the building with contaminated floor, ceiling, and walls for light industrial use, per the guidance in the Technical Basis for Calculating Radiation Doses for the Building Occupancy Scenario Using the Probabilistic RESRAD-BUILD 3.0 Code (Nuclear Regulatory Commission [NRC], 2002).

1.5 REPORT ORGANIZATION

This report is organized as follows:

- Section 1.0 presents the site description.
- Section 2.0 describes the historical site assessment.
- Section 3.0 provides the release criteria.
- Section 4.0 describes the survey design.
- Section 5.0 details the field activities.
- Section 6.0 describes the survey instrumentation.
- Section 7.0 provides the efficiency and detection sensitivity.
- Section 8.0 details the survey procedures and measurement data interpretation.
- Section 9.0 provides the analysis and results.
- Section 10.0 provides the dose modeling.
- Section 11.0 provides the conclusions.
- Section 12.0 provides the references.
- Table and figures follow the text.

Appendices A and B provide survey instrumentation data and instrument calibration documentation. Appendices C through E present field measurements and data analysis. Appendix F presents the off-site gamma (γ) spectroscopy data. Appendix G includes materials and equipment release data. Appendix H is a photographic log of activities at Building 344. Appendix I is the quality control (QC) analysis of the laboratory data. Appendix J provides dose modeling reports. Appendix K provides background data sheets from the reference area.

11.0 CONCLUSION

Building 344 was used for storage associated with the RADIAC Maintenance Calibration School on TI. The building is a thick-walled, reinforced concrete structure partially below grade. Building 344 was considered radiologically impacted due to the storage of radioactive materials in the building and other radiological activities at TI. The entire building, consisting of a single room, was investigated for residual contamination. An FSS was conducted to determine the radiological status of Building 344 and whether the building could be released for unrestricted use.

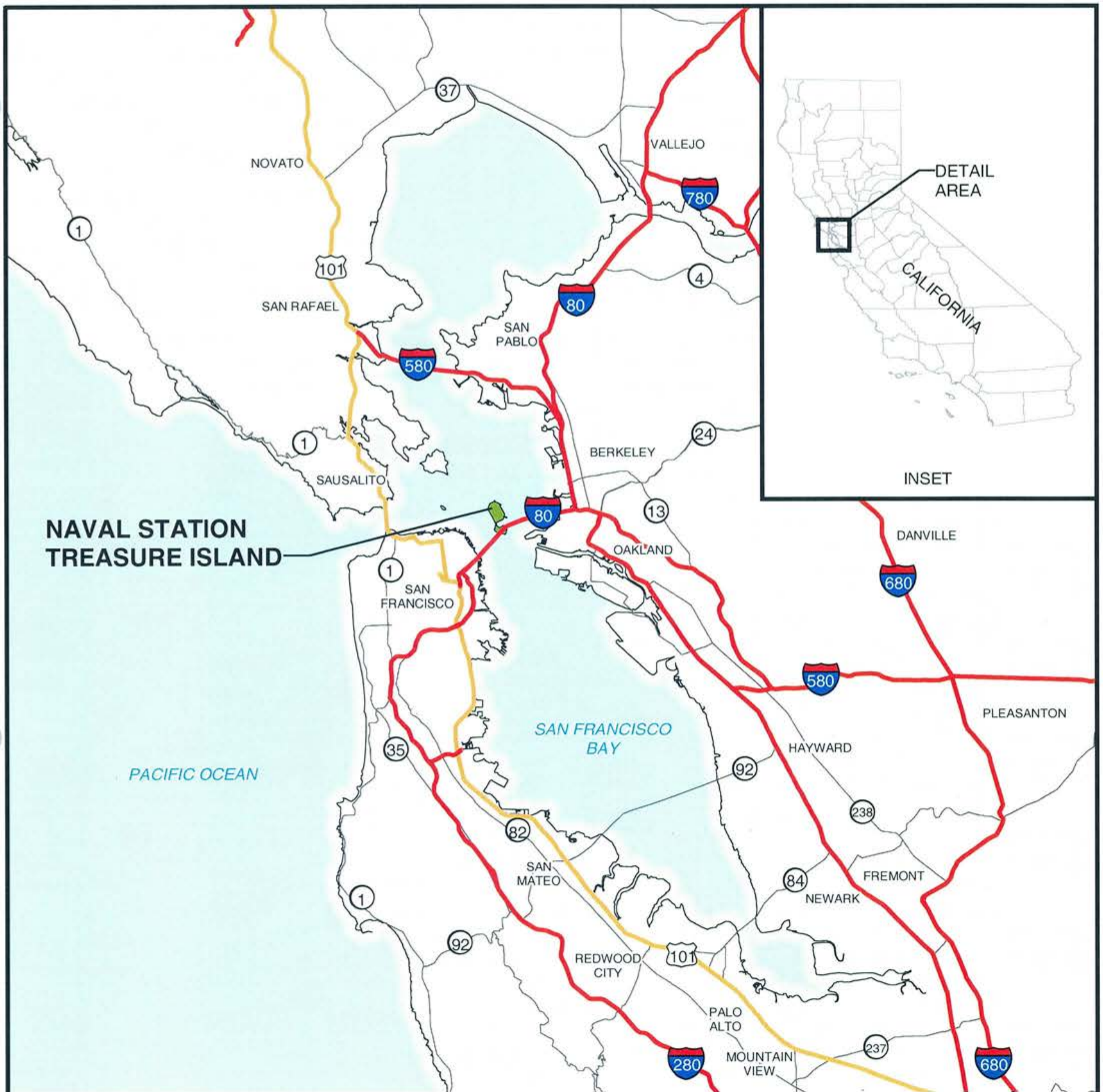
Surveys of Building 344 and associated materials and equipment were conducted in September 2007. The building was organized into two survey units: floor and lower walls (Class 1, Survey Unit 1) and ceiling and upper walls (Class 2, Survey Unit 2). FSS methods included, where appropriate, fixed static and scan surface contamination surveys for α and β radiation, static and scan measurements for γ radiation, exposure rate measurements, and swipe samples for loose α, β, and γ radiation.

A single elevated measurement in the Survey Unit 2 (Class 2 survey area) was extensively studied with additional static measurements and physical samples sent for γ spectroscopy analysis. The particular location was in close proximity to an air handling system installed in the building. The results of the additional analysis showed no elevated levels of the ROC and no other causes for concern. It is speculated that the blower system and other building parameters might have caused a preferential accumulation of radon gas (due to static attraction) in the area of the elevated measurement. Based on the building's location (partially below grade) and the proximity of the elevated measurement location to an air handling system, it is likely that the elevated reading was due to radon accumulation. Detailed information from the γ spectroscopy analysis is presented in Appendix F.

Survey results were statistically analyzed using the paired t-test and the WRS test to determine if residual radioactivity was present and to determine if conditions within the survey units met the release criteria for unrestricted use. All survey and sample results indicate that Building 344 meets the release criteria and that the building can be released to unrestricted use. The statistical test results can be found in Appendices C and D.

The analysis of collected field data shows that the residual radioactivity at Building 344 meets the stated release criteria and that the building is ready for unconditional unrestricted use. Dose modeling based on average net concentration levels of the ROC resulted in calculated doses of 0.009 or less mrem/y for both survey units, which is less than the 1 mrem/y TEDE release criterion. The dose represents less than 1 percent of the estimated 360 mrem/y dose that the average U.S. resident receives from natural and manmade background radiation sources.

A small area with elevated scan readings was identified near one of the systematic survey points. Supplementary measurements and off-site γ spectroscopy analyses of solid samples from the elevated area indicated only elevated lead-210 levels associated with the hot spot. As the ROC was not present in the solid samples, the measurements of the elevated spot were excluded from the final statistical analysis. The cause of the elevated readings has been speculated to be due to preferential accumulation of radon gas at the measurement location.



LEGEND

- 1 STATE HIGHWAY
- 101 US HIGHWAY
- 280 INTERSTATE HIGHWAY
- TREASURE ISLAND
- WATER

4 0 4 8 Miles

Scale: 1" = 8 Miles

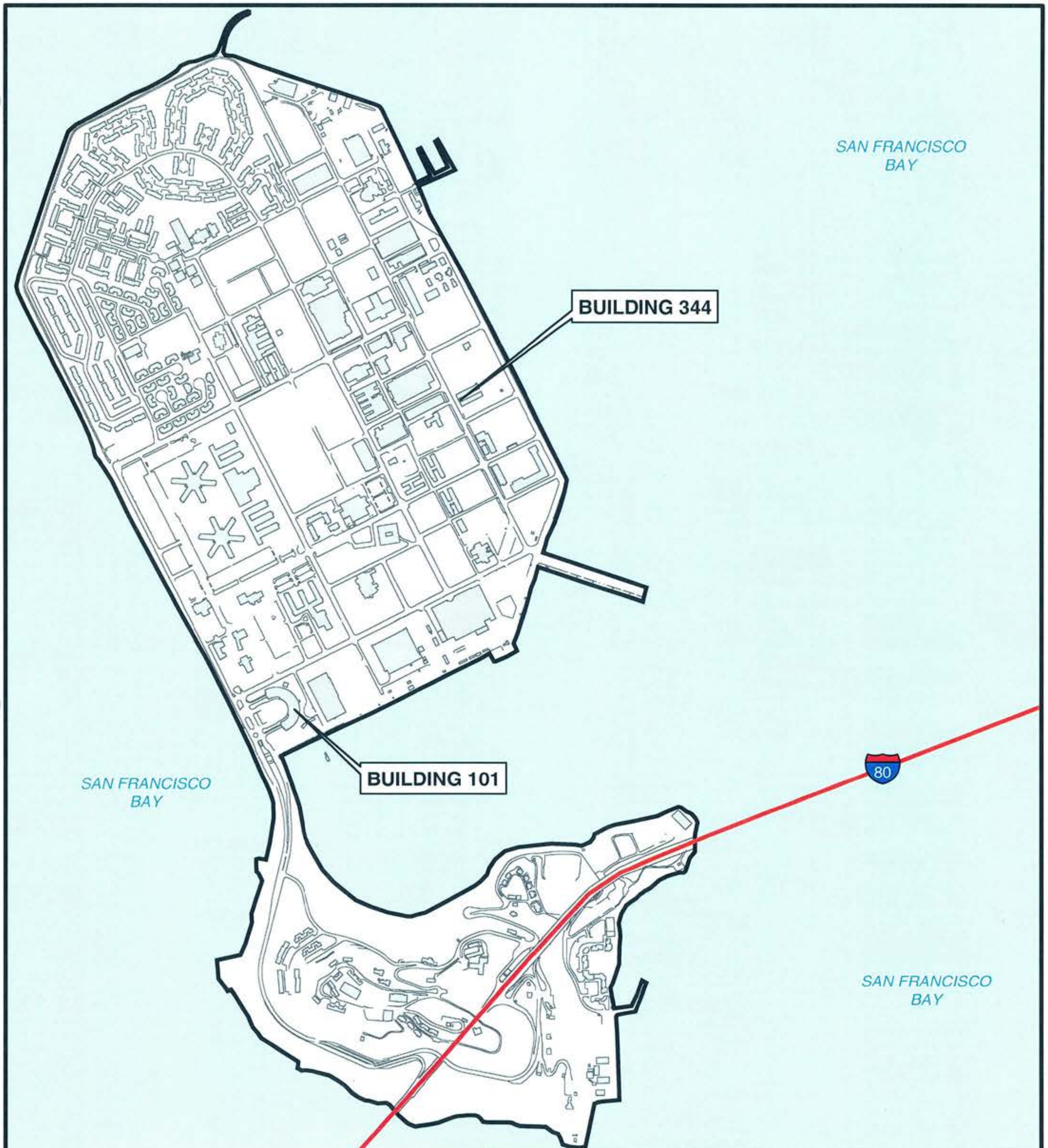
N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL STATUS SURVEY
REPORT FOR BUILDING 344
FIGURE 1-1
REGIONAL LOCATION MAP
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 2
AUTHOR: GFG
DCN: ECSD-2201-0021-0010
FILE NUMBER: 080089R2170.mxd

TETRA TECH EC, INC.



LEGEND

80 INTERSTATE HIGHWAY

NAVAL STATION TREASURE ISLAND BASE BOUNDARY

600 0 600 1,200 Feet

Scale: 1" = 1200'

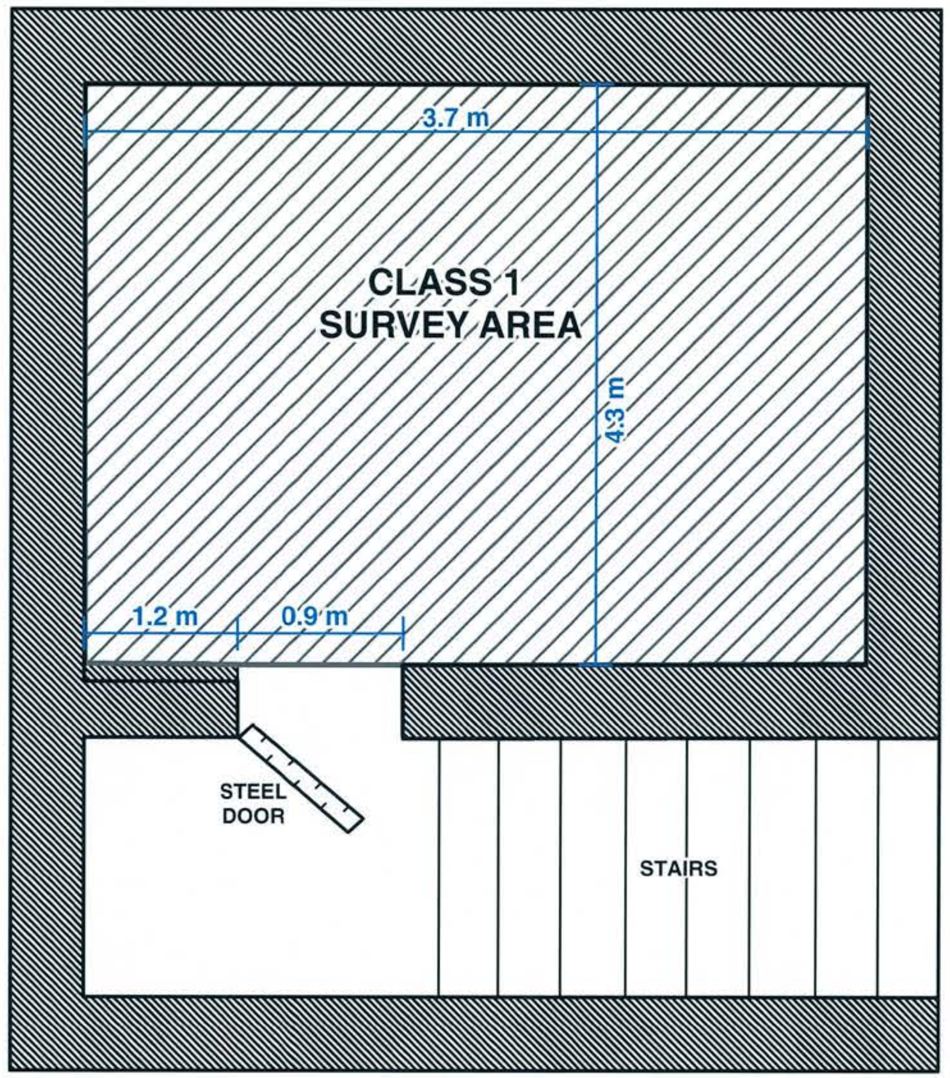
N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

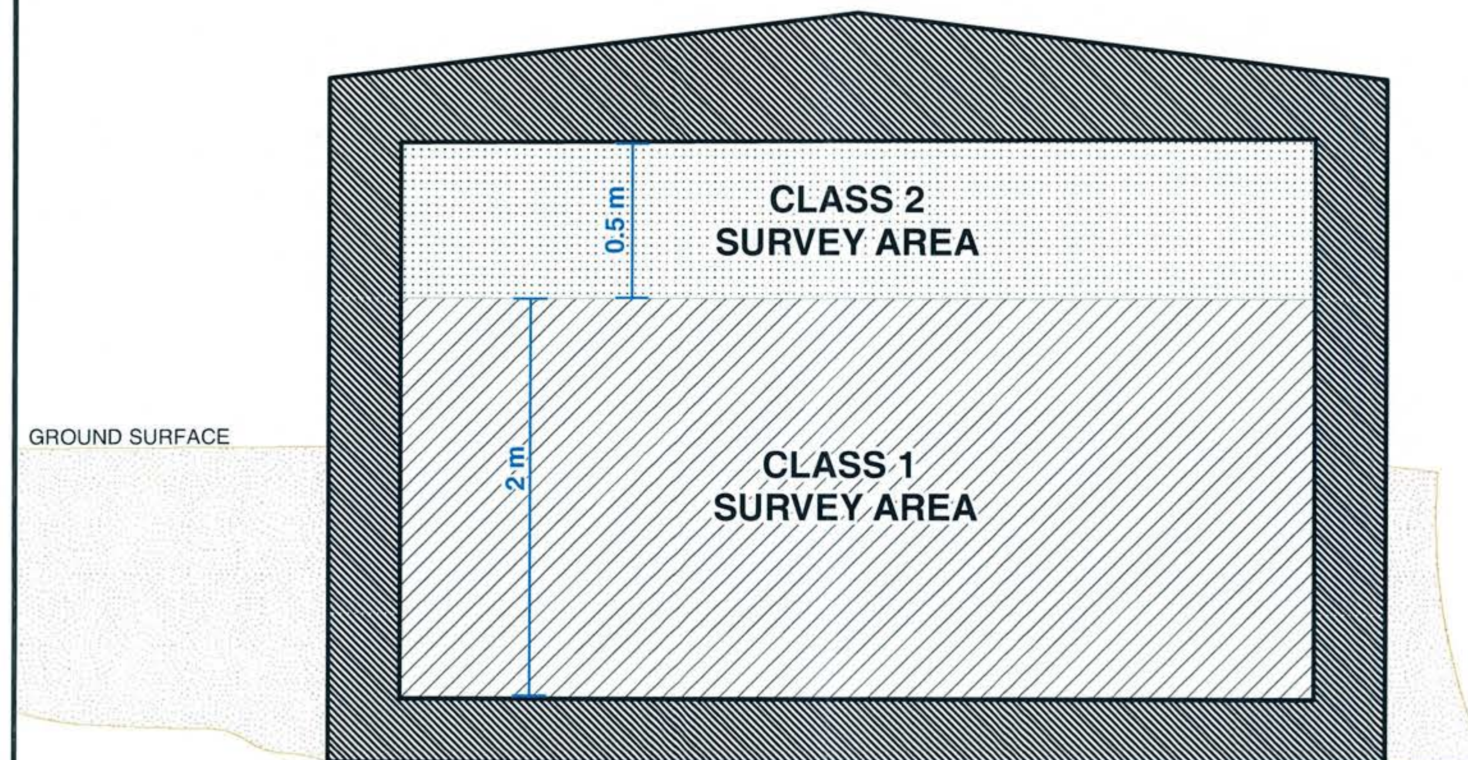
FINAL STATUS SURVEY REPORT
FOR BUILDING 344
FIGURE 1-2
SITE LOCATION MAP
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 2
AUTHOR: GFG
DCN: ECSD-2201-0021-0010
FILE NUMBER: 080089S2173.mxd

TETRA TECH EC, INC.



BUILDING 344 FLOOR PLAN



BUILDING 344 FRONT PROFILE

LEGEND

- CLASS 1 SURVEY AREA INCLUDES THE FLOORS AND ALL AREAS AT OR BELOW A LINE 2 METERS ABOVE THE FLOOR
- CLASS 2 SURVEY AREA INCLUDES THE CEILING AND ALL AREAS ABOVE 2 METERS ON THE WALLS
- CONCRETE
- STEEL
- SOIL

NOTE:

m - METER

1.5 0 1.5 3 Feet

Scale: 1" = 3'

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL STATUS SURVEY REPORT
FOR BUILDING 344

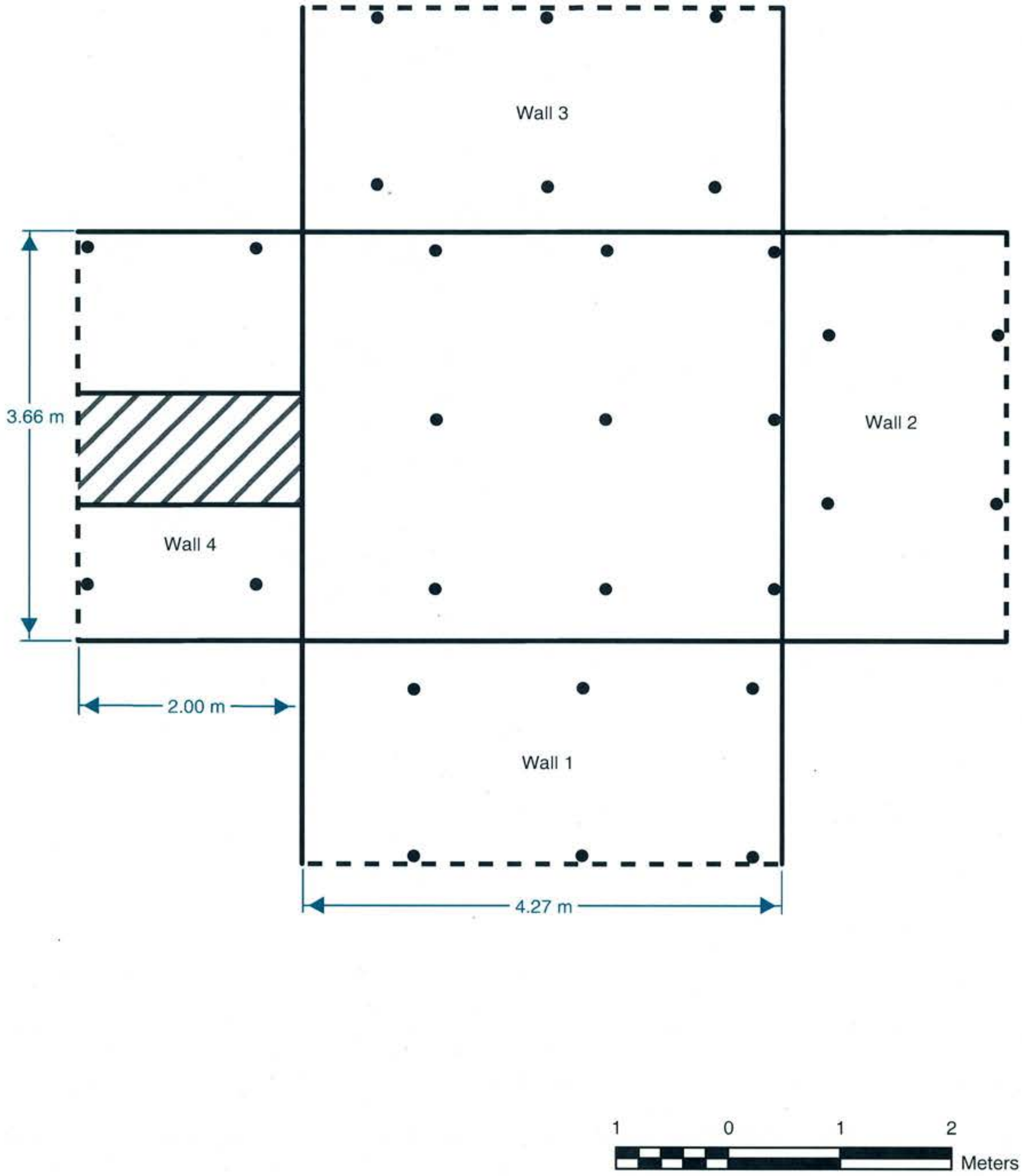
FIGURE 1-3

BUILDING 344 FLOOR PLAN AND FRONT PROFILE

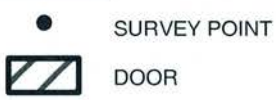
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: RKH
DCN: ECSD-2201-0021-0010
FILE NUMBER: 080089L3406.mxd

TETRA TECH EC, INC.

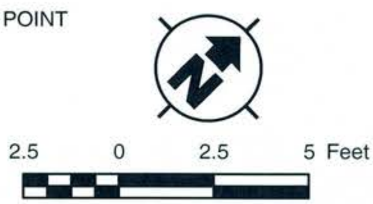


LEGEND



NOTE:

m - METERS



Scale: 1" = 5'

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

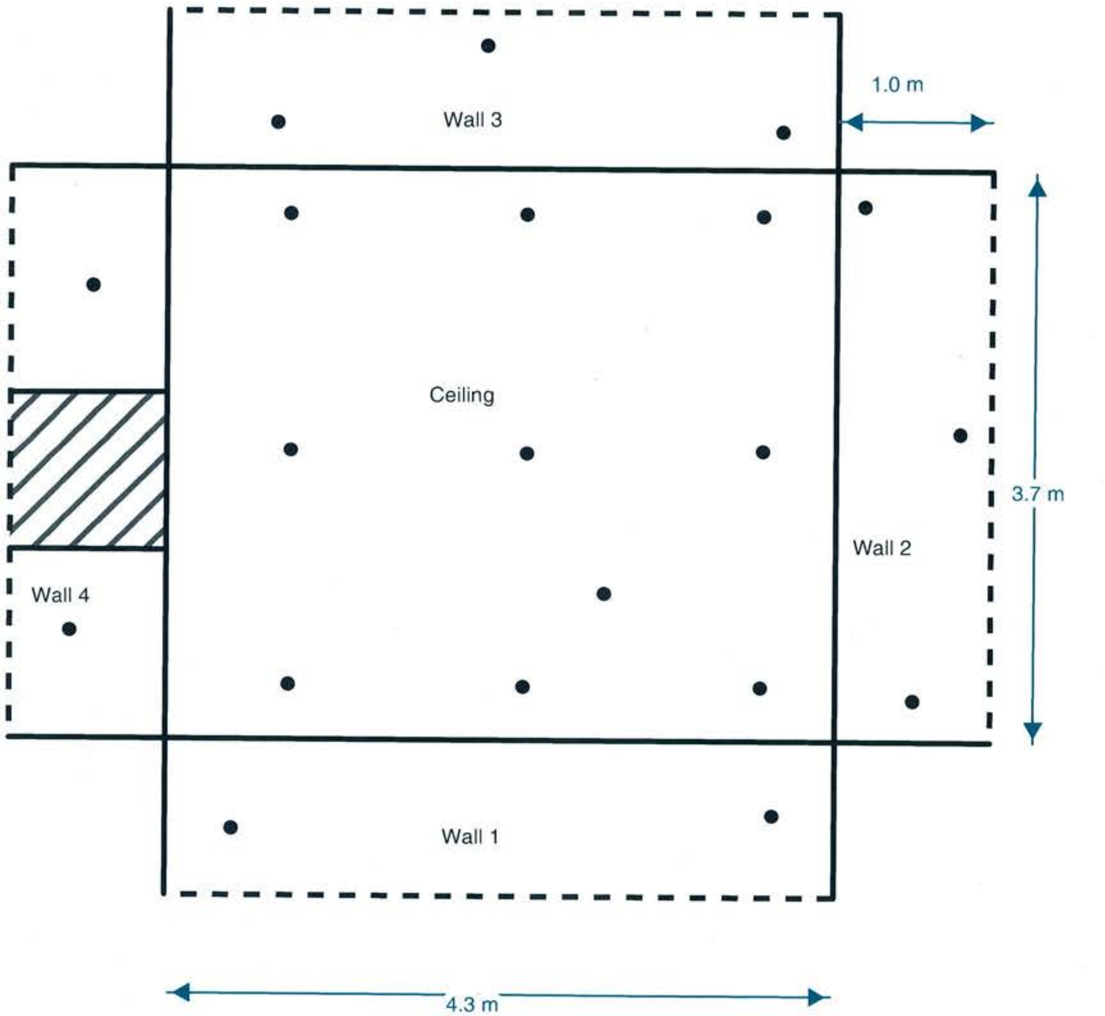
FINAL STATUS SURVEY REPORT
FOR BUILDING 344

FIGURE 4-1

SURVEY UNIT 1 SURVEILLANCE POINTS
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 1
AUTHOR: RKH
DCN: ECSD-2201-0021-0010
FILE NUMBER: 080089L2212.mxd

TETRA TECH EC, INC.



1 0 1 2 Meters

LEGEND

- SURVEY POINT
- DOOR

NOTE:

m - METERS

2 0 2 4 Feet

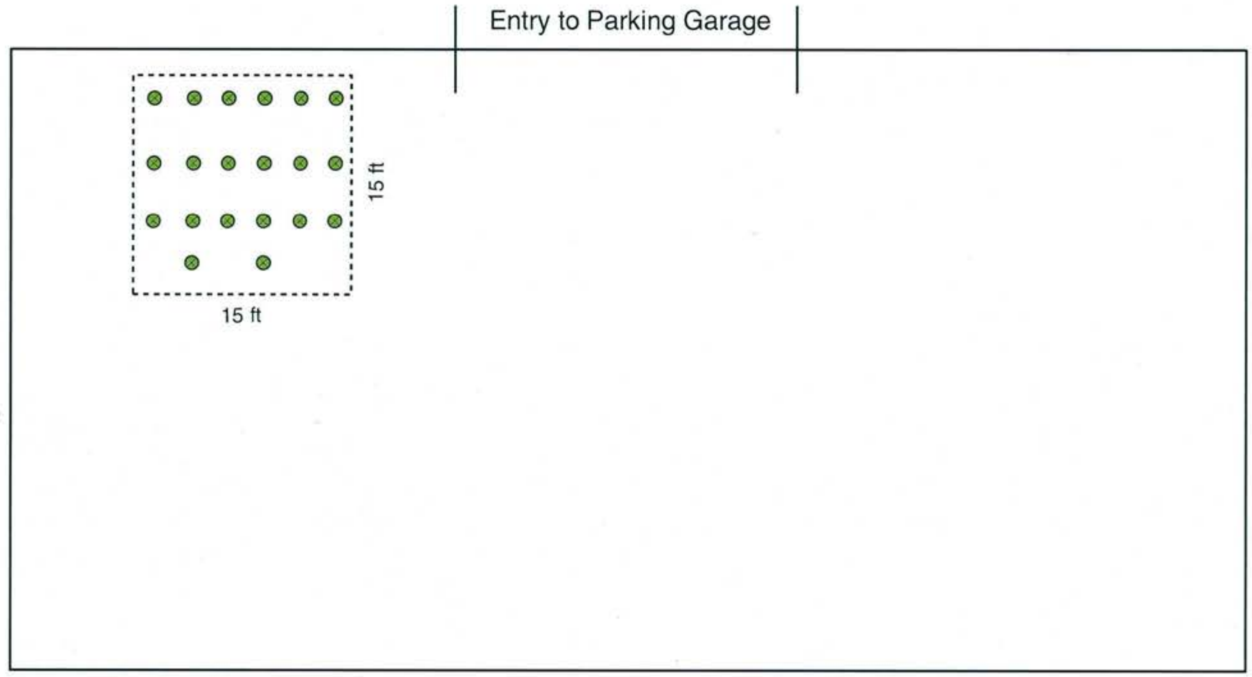
Scale: 1" = 4'

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL STATUS SURVEY REPORT
FOR BUILDING 344
FIGURE 4-2
SURVEY UNIT 2 SURVEILLANCE POINTS
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 1
AUTHOR: RKH
DCN: ECSD-2201-0021-0010
FILE NUMBER: 080089L2213.mxd

TETRA TECH EC, INC.



LEGEND

- ALPHA, BETA, AND GAMMA STATIC MEASUREMENT
- BACKGROUND SURVEY AREA
- PARKING GARAGE

NOT TO SCALE

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

FINAL STATUS SURVEY REPORT
FOR BUILDING 344

FIGURE 4-3

BACKGROUND SURVEY MEASUREMENT LOCATIONS
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: RKH
DCN: ECSD-2201-0021-0010
FILE NUMBER: 080089L3407.mxd

TETRA TECH EC, INC.

APPENDIX E

FIELD SURVEY DATA SHEETS

FIELD DATA SHEET

SURVEY NUMBER:	RSRS-Bldg-344-MRSM-09-18-07	Description: Floor and Walls	
SURVEYOR:	S.Rolfe/T.Standfuss	LOCATION: Building 344	

Instrument Background Data					
Instrument Description	Gamma Background CPM or µR/hr	Alpha Background CPM	Alpha Efficiency	Beta/Gamma Background CPM	Beta Efficiency
2360/43-68		1.025	29.5	171.975	34.55
2360/43-68		1.025	29.5	171.975	34.55
2929		0.2	66.900%	77.38	54.200%
Model 19	N/A				
2350-1/44-10	6.8912	2350 Scan range: 5.9-6.6 Kcpm			
2360 Static Count Time:	2	Floor Monitor Bkgd Count time			2
2350 Static Count Time:	1				
Date:	9/19/2007				
Time:	1330				
Swipe Count Time:	3				

2360 INFO				
2360 S/N	177117	Cal Due	08/28/08	
Detector type	43-37		α Scan range:	0 - 3
Detector S/N	190328		β Scan range:	200-300

2360 INFO				
2360 S/N	177117	Cal Due	08/28/08	
Detector type	43-68		α Scan range:	N/A
Detector S/N	95526		β Scan range:	N/A

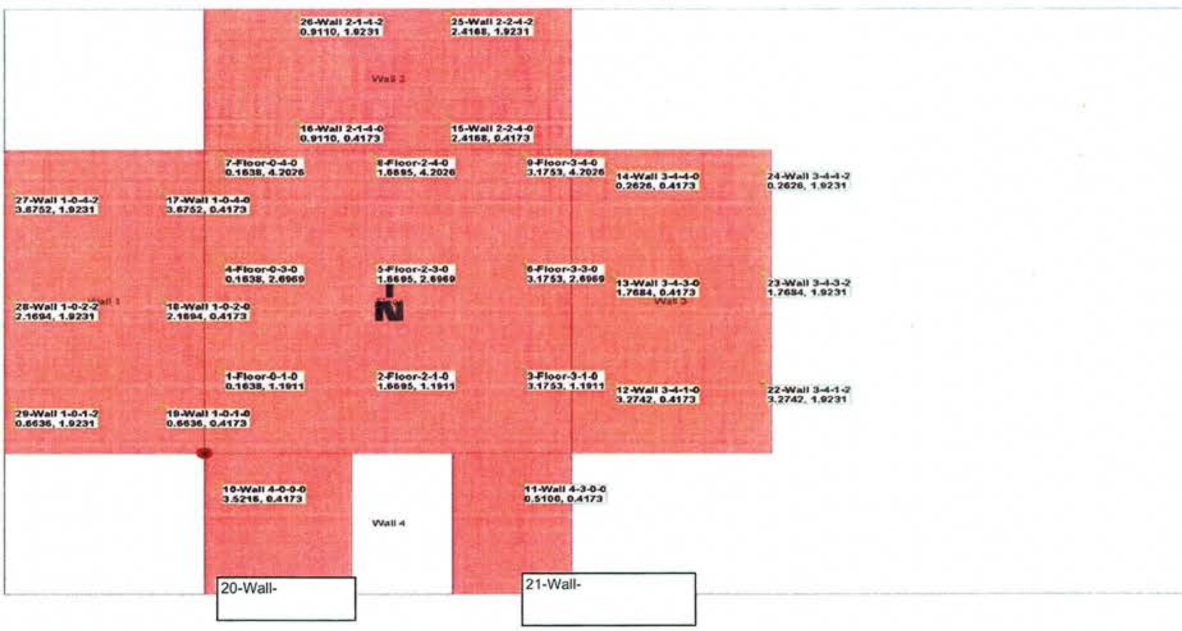
2350 INFO			
2350 S/N	126182	Cal Due	08/28/08
Detector type	44-10		
Detector S/N	230620		

Model 19 Info

Location	Exposure Rate (µR/hr)		Fixed + Removable			Removable		Comments
	Contact	1 Meter	Gamma CPM	Alpha Total Counts	Beta/Gamma Total Counts	Alpha Total Counts	Beta/Gamma Total Counts	
1	6.9	N/A	6601	12	275	2	291	N/A
2	6.6	N/A	6269	7	256	0	268	N/A
3	6.3	N/A	6037	7	258	0	294	N/A
4	6.7	N/A	6423	2	257	0	287	N/A
5	6.8	N/A	6475	11	251	0	280	N/A
6	6.9	N/A	6543	4	287	3	296	N/A
7	6.8	N/A	6497	5	225	0	281	N/A
8	6.6	N/A	6315	5	271	1	282	N/A
9	6.8	N/A	6518	8	273	0	256	N/A
10	6.9	N/A	6542	2	247	0	292	N/A
11	6.7	N/A	6363	2	313	1	261	N/A
12	6.2	N/A	5928	8	273	1	281	N/A
13	6.6	N/A	6341	7	290	0	279	N/A
14	6.7	N/A	6411	12	295	1	281	N/A
15	6.6	N/A	6282	6	205	1	330	N/A
16	6.7	N/A	6371	11	280	1	265	N/A
17	6.7	N/A	6389	7	269	2	249	N/A
18	6.7	N/A	6409	5	282	0	288	N/A
19	6.8	N/A	6466	14	250	2	303	N/A
20	6.6	N/A	6342	6	275	0	276	N/A
21	6.5	N/A	6184	11	285	1	286	N/A
22	6.4	N/A	6136	5	276	2	262	N/A
23	6.5	N/A	6209	7	280	0	247	N/A
24	6.6	N/A	6340	13	278	1	279	N/A
25	6.5	N/A	6182	12	271	1	264	N/A
26	6.7	N/A	6378	8	276	1	280	N/A
27	6.7	N/A	6423	13	274	1	277	N/A
28	6.7	N/A	6399	12	280	2	289	N/A
29	6.7	N/A	6354	10	283	0	287	N/A
30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

RADIATION/CONTAMINATION SURVEY FORM

	INSTRUMENTATION USED						
Date: 9/19/2007 Time: 13:30	Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA * (dpm/100cm²)	Background * (dpm/100cm²)
Survey Number: RSRS-Bldg-344-MRSM-09-18-07							
Location: Building 344	2360 43-68	177117 95526	8/28/2008	α 29.50% βγ 34.55%	α 7.38% βγ 8.64%	α 51.97 βγ 409.98	α 11.03 βγ 1580.18
Surveyor: S.Rolfe/T.Standfuss	2929	182585	9/6/2008	α 66.90% βγ 54.20%	α 16.73% βγ 13.55%	α 3.29 βγ 45.42	α 1.20 βγ 571.07
Reviewed By: B Henderson	2350-1 44-10	126182 230620	8/28/2008				6.8912 Kcpm
Isotopes of Concern: ^{137}Cs							
Survey Type: Final Status Survey	2360 Static Count Time: 2 Minutes				2350 Static Count Time: 1 Minute		
Description of survey: Floor and Walls							



Comments:

Smears and Statics counts taken and each cooridnate listed on map.

Scan Ranges 0 - 3 cpm alpha and 200-300 cpm beta.

(#) denotes swipe location or fixed α/β readings

# denotes G/A radiation readings

#/# denotes contact / 1 meter radiation readings.

* denotes highest radiation reading on contact

Δ denotes large area masslinn wipe

\+ Unless Otherwise Noted

All readings in μR/hr unless otherwise noted

K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

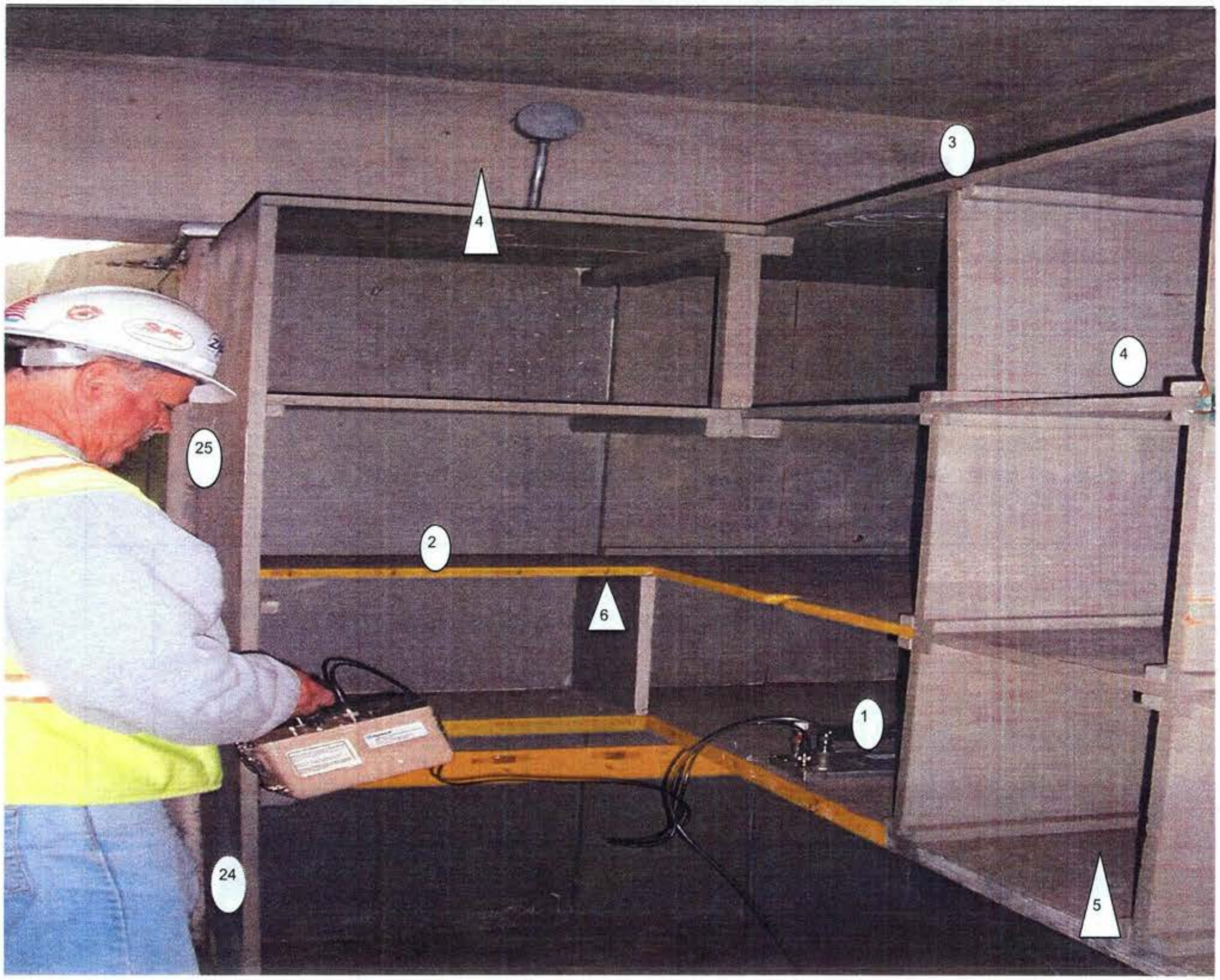
SURVEY NUMBER: RSRS-Bldg-344-MRSM-09-18-07

SURVEYOR: S.Rolfe/T.Standfuss

LOCATION: Building 344

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha $dpm/100cm^2$	Beta/Gamma $dpm/100cm^2$	Alpha $dpm/100cm^2$	Beta/Gamma $dpm/100cm^2$	
1	6.9		6601	53.54	-316.77	2.79	144.80	
2	6.6		6269	26.63	-404.06	-1.20	88.22	
3	6.3		6037	26.63	-394.87	-1.20	152.18	
4	6.7		6423	-0.27	-399.47	-1.20	134.96	
5	6.8		6475	48.16	-427.03	-1.20	117.74	
6	6.9		6543	10.49	-261.64	4.78	157.10	
7	6.8		6497	15.87	-546.48	-1.20	120.20	
8	6.6		6315	15.87	-335.15	0.80	122.66	
9	6.8		6518	32.02	-325.96	-1.20	58.70	
10	6.9		6542	-0.27	-445.41	-1.20	147.26	
11	6.7		6363	-0.27	-142.19	0.80	71.00	
12	6.2		5928	32.02	-325.96	0.80	120.20	
13	6.6		6341	26.63	-247.86	-1.20	115.28	
14	6.7		6411	53.54	-224.89	0.80	120.20	
15	6.6		6282	21.25	-638.37	0.80	240.74	
16	6.7		6371	48.16	-293.80	0.80	80.84	
17	6.7		6389	26.63	-344.34	2.79	41.48	
18	6.7		6409	15.87	-284.61	-1.20	137.42	
19	6.8		6466	64.30	-431.63	2.79	174.32	
20	6.6		6342	21.25	-316.77	-1.20	107.90	
21	6.5		6184	48.16	-270.83	0.80	132.50	
22	6.4		6136	15.87	-312.18	2.79	73.46	
23	6.5		6209	26.63	-293.80	-1.20	36.56	
24	6.6		6340	58.92	-302.99	0.80	115.28	
25	6.5		6182	53.54	-335.15	0.80	78.38	
26	6.7		6378	32.02	-312.18	0.80	117.74	
27	6.7		6423	58.92	-321.37	0.80	110.36	
28	6.7		6399	53.54	-293.80	2.79	139.88	
29	6.7		6354	42.78	-280.02	-1.20	134.96	

Reviewer	Date: 9/20/2007	RSO/RTM	Date: September 20, 2007
Bo [illegible]	Time: 1700	Daryl E. DeLong	Time: 1730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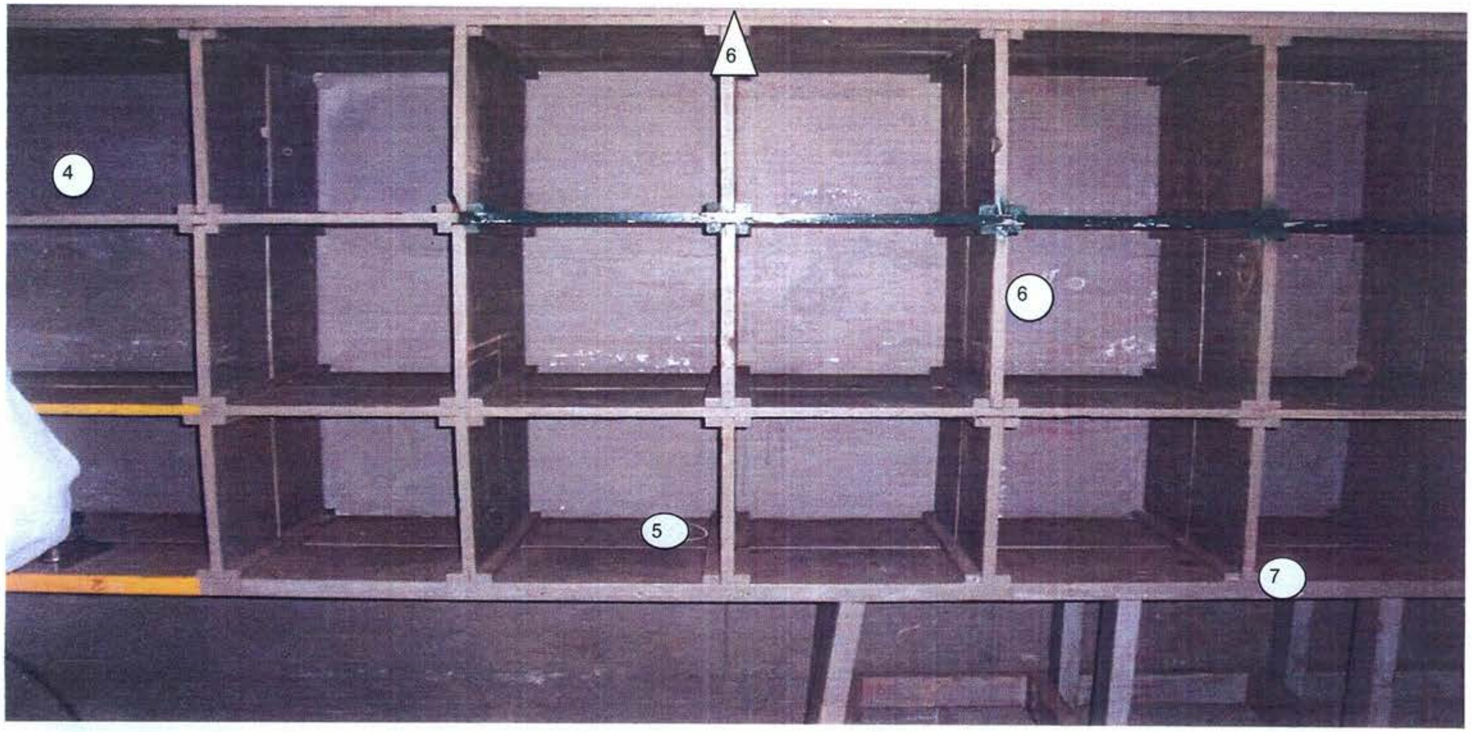
6
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17
19
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21

FIELD DATA SHEET

SURVEY NUMBER:	RSRS-Bldg-344-Class-2-09-25-07	Description: Walls and Celing	
SURVEYOR:	S.Rolfe/T.Standfuss	LOCATION: Building 344	

Instrument Background Data

Instrument Description	Gamma Background CPM or µR/hr	Alpha Background CPM	Alpha Efficiency	Beta/Gamma Background CPM	Beta Efficiency
2360/43-68	[redacted]	1.025	29.5	171.975	34.55
2360/43-68	[redacted]	1.025	29.5	171.975	34.55
2929	[redacted]	0.03	66.900%	70.2	54.200%
Model 19	N/A	[redacted]			
2350-1/44-10	6.89192	2350 Scan range: 6.1-6.9			
2360 Static Count Time:	2	Floor Monitor Bkgd Count time			2
2350 Static Count Time:	1				
Date:	9/25/2007				
Time:	1330				
Swipe Count Time:	3				

Location	Exposure Rate (µR/hr) Contact	Exposure Rate (µR/hr) 1 Meter	Fixed + Removable Gamma CPM	Fixed + Removable Alpha Total Counts	Fixed + Removable Beta/Gamma Total Counts	Removable Alpha Total Counts	Removable Beta/Gamma Total Counts	Comments
1	7	N/A	6657	13	291	1	195	N/A
2	6.8	N/A	6536	12	261	1	203	N/A
3	6.9	N/A	6565	14	287	2	190	N/A
4	6.9	N/A	6557	7	286	1	208	N/A
5	6.8	N/A	6481	11	285	1	202	N/A
6	6.7	N/A	6432	14	281	0	185	N/A
7	6.7	N/A	6384	43	345	1	163	N/A
8	6.7	N/A	6436	15	284	0	177	N/A
9	6.6	N/A	6296	8	263	0	169	N/A
10	6.7	N/A	6365	13	271	1	170	N/A
11	6.8	N/A	6532	8	276	0	164	N/A
12	6.8	N/A	6460	7	298	0	157	N/A
13	6.7	N/A	6376	11	312	1	151	N/A
14	6.7	N/A	6350	6	285	0	159	N/A
15	6.9	N/A	6587	16	320	0	158	N/A
16	6.7	N/A	6392	12	286	2	160	N/A
17	6.7	N/A	6416	8	321	0	173	N/A
18	6.7	N/A	6390	12	276	0	174	N/A
19	6.7	N/A	6409	14	328	1	149	N/A
20	6.7	N/A	6427	12	272	0	165	N/A
21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
23	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
26	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
27	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
29	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

2360 INFO

2360 S/N	177117	Cal Due	08/28/08
Detector type	43-37	α Scan range:	1-9
Detector S/N	190328	β Scan range:	250-350

2360 INFO

2360 S/N	177117	Cal Due	08/28/08
Detector type	43-68	α Scan range:	N/A
Detector S/N	95526	β Scan range:	N/A

2350 INFO

2350 S/N	126182	Cal Due	08/28/08
Detector type	44-10		
Detector S/N	230620		

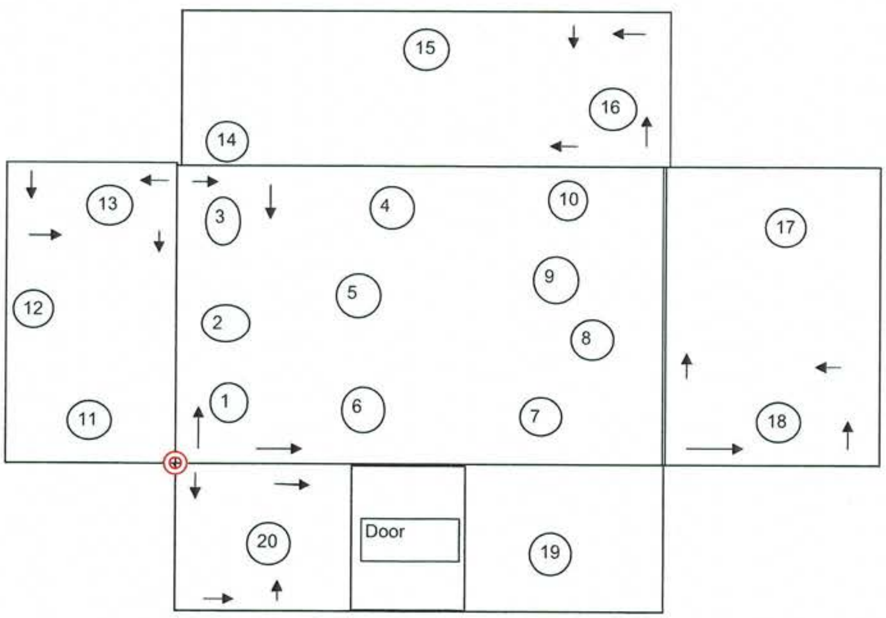
Model 19 Info

RADIATION/CONTAMINATION SURVEY FORM

Date: Time: 9/25/2007 13:30	INSTRUMENTATION USED						
	Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm^2)	Background + (dpm/100cm^2)
Survey Number: RSRS-Bldg-344-Class-2-09-25-07							
Location: Building 344	2360 43-68	177117 95526	8/28/2008	α 29.50% $\beta\gamma$ 34.55%	α 7.38% $\beta\gamma$ 8.64%	α 51.97 $\beta\gamma$ 409.98	α 11.03 $\beta\gamma$ 1580.18
Surveyor: S.Rolfe/T.Standfuss	2929	182585	4/16/2008	α 66.90% $\beta\gamma$ 54.20%	α 16.73% $\beta\gamma$ 13.55%	α 2.19 $\beta\gamma$ 43.35	α 0.18 $\beta\gamma$ 518.08
Reviewed By: B Henderson	2350-1 44-10	126182 230620	8/28/2008				6.89192 Kcpm
Isotopes of Concern: ^{137}Cs							

Survey Type: Building Release	2360 Static Count Time: 2 Minutes	2350 Static Count Time: 1 Minute

Description of survey: Walls and Celing



Comments:

50% Scans were performed in celing and walls above 2 meters.

Static counts and smears were taken at highest reading found during scans.

Statis counts were performed on Location 7 after concrete chip samples were taken (09/27/07). Gamma static was 6495 cpm, Alpha 22.5 cpm, and Beta 172 cpm.

(#) denotes swipe location or fixed α/β readings

# denotes G/A radiation readings

#/# denotes contact / 1 meter radiation readings.

* denotes highest radiation reading on contact

Δ denotes large area masslinn wipe

\+ Unless Otherwise Noted

All readings in μR/hr unless otherwise noted

K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: RSRS-Bldg-344-Class-2-09-25-07

SURVEYOR: S.Rolfe/T.Standfuss

LOCATION: Building 344

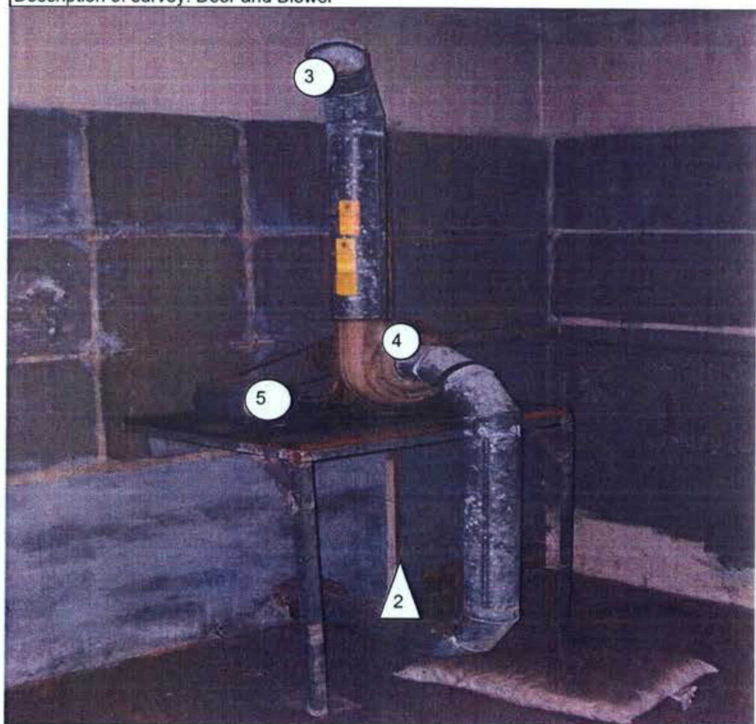
Location	Exposure Rate (μR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha $dpm/100cm^2$	Beta/Gamma $dpm/100cm^2$	Alpha $dpm/100cm^2$	Beta/Gamma $dpm/100cm^2$	
1	7		6657	58.92	-243.26	1.81	-38.38	
2	6.8		6536	53.54	-381.09	1.81	-18.70	
3	6.9		6565	64.30	-261.64	3.81	-50.68	
4	6.9		6557	26.63	-266.23	1.81	-6.40	
5	6.8		6481	48.16	-270.83	1.81	-21.16	
6	6.7		6432	64.30	-289.21	-0.18	-62.98	
7	6.7		6384	220.34	4.82	1.81	-117.10	
8	6.7		6436	69.68	-275.42	-0.18	-82.66	
9	6.6		6296	32.02	-371.90	-0.18	-102.34	
10	6.7		6365	58.92	-335.15	1.81	-99.88	
11	6.8		6532	32.02	-312.18	-0.18	-114.64	
12	6.8		6460	26.63	-211.10	-0.18	-131.86	
13	6.7		6376	48.16	-146.79	1.81	-146.62	
14	6.7		6350	21.25	-270.83	-0.18	-126.94	
15	6.9		6587	75.06	-110.03	-0.18	-129.40	
16	6.7		6392	53.54	-266.23	3.81	-124.48	
17	6.7		6416	32.02	-105.44	-0.18	-92.50	
18	6.7		6390	53.54	-312.18	-0.18	-90.04	
19	6.7		6409	64.30	-73.28	1.81	-151.54	
20	6.7		6427	53.54	-330.55	-0.18	-112.18	

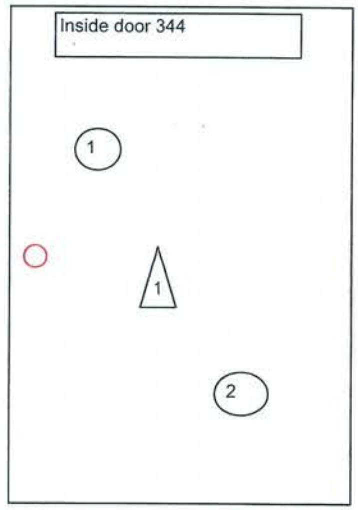
Reviewer	Date: 9/28/2007	RSO/RTM	Date: September 28, 2007
Bn [signature]	Time: 1700	Daryl E. DeFong [signature]	Time: 1730

RADIATION/CONTAMINATION SURVEY FORM   Page 1 of 2

Date: Time: 9/25/2007 12:30	INSTRUMENTATION USED						
	Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA+ (dpm/100cm²)	Background+ (dpm/100cm²)
Survey Number: RSRS-Bldg344door-blower-092507							
Location: Building 344	2360 43-68	177117 95526	8/28/2008	α 29.50% βγ 34.55%	α 7.38% βγ 8.64%	α 51.53 βγ 362.20	α 10.76 βγ 1222.06
Surveyor: S.Rolfe/T.Standfuss	2929	182585	9/6/2008	α 66.90% βγ 54.20%	α 16.73% βγ 13.55%	α 3.29 βγ 45.42	α 1.20 βγ 571.07
Reviewed By: B Henderson	2350-1 44-10	126182 230620	8/28/2008				5.897 Kcpm
Isotopes of Concern: ^{137}Cs							
Survey Type: Building Release	2360 Static Count Time: 2 Minutes				2350 Static Count Time: 1 Minute		

Description of survey: Door and Blower





Comments:

All LAW's were ≤ background.

Scan readings were≤ background for alpha and beta readings.

(#) denotes swipe location or fixed α/β readings
# denotes G/A radiation readings
#/# denotes contact / 1 meter radiation readings.
* denotes highest radiation reading on contact

Δ denotes large area masslinn wipe
+ Unless Otherwise Noted
All readings in μR/hr unless otherwise noted
K = 1000

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: RSRS-Bldg344door-blower-092507

SURVEYOR: S.Rolfe/T.Standfuss

LOCATION: Building 344

Location	Exposure Rate (μR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
1			4877	26.90	-229.71	-1.20	-101.21	
2			4650	37.66	-211.33	0.80	-128.27	
3			5529	10.76	-238.90	0.80	2.12	
4			5242	32.28	-385.91	0.80	-93.83	
5			5612	10.76	-133.23	0.80	-111.05	

Reviewer	Date:	RSO/RTM	Date:
	Time:		Time:

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-06-D-2201
CTO NO. 0021

FINAL

SCOPING SURVEY REPORT FOR BUILDING 233 DRAIN LINES AND WALL VENTS

October 31, 2008

DCN: ECSD-2201-0021-0009

BUILDING 233
NAVAL STATION TREASURE ISLAND
TREASURE ISLAND, CALIFORNIA

Base Realignment and Closure
Program Management Office West
1455 Frazee Road, Suite 900
San Diego, California 92108-4310

CONTRACT NO. N62473-06-D-2201
CTO NO. 0021

FINAL

SCOPING SURVEY REPORT FOR BUILDING 233 DRAIN LINES AND WALL VENTS

October 31, 2008

BUILDING 233
NAVAL STATION TREASURE ISLAND
TREASURE ISLAND, CALIFORNIA

DCN: ECSD-2201-0021-0009

TETRA TECH EC, INC.
1230 Columbia Street, Suite 750
San Diego, California 92101-8536

Cliff Stephan
Technical Lead

Brian Maidrand
Project Manager

Patrick A. Owens
Radiological Affairs Support Office

TETRA TECH EC, INC.

TRANSMITTAL/DELIVERABLE RECEIPT

Contract No. N62473-06-D-2201 (RAC IV)

Document Control No. ECSD-2201-0021-0009

File Code: 5.0

TO: Contracting Officer
Naval Facilities Engineering Command SW
Ms. Beatrice Appling, AQE.BA
Building 127, Room 108
1220 Pacific Highway
San Diego, CA 92132-5190

DATE: 11/03/08
CTO: 0021
LOCATION: Treasure Island, CA

FROM: A. N. Bolt

A. N. Bolt, Program Manager

DESCRIPTION: Final Scoping Survey Report for Building 233 Drain Lines and Wall Vents, October 31, 2008. Building 233

TYPE: ☐ Contract/Deliverable ☒ CTO Deliverable ☐ Notification ☐ Other

VERSION: Final (e.g. Draft, Draft Final, Final, etc.)

REVISION #: N/A

ADMIN RECORD: Yes ☒ No ☐ Category ☐ Confidential ☐
(PM to Identify)

SCHEDULED DELIVERY DATE: 10/31/08 ACTUAL DELIVERY DATE: 11/03/08

NUMBER OF COPIES SUBMITTED: O/9C/6E Copy of SAP to N. Ancog ☒

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1C		

1230 Columbia Street, Suite 750, San Diego, CA 92101

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EXECUTIVE SUMMARY

This report presents results of the scoping survey of the drain lines at Building 233 performed in September 2007. Building 233 is located at Naval Station Treasure Island (NAVSTA TI) on the eastern portion of Treasure Island (TI). NAVSTA TI is located on two islands in San Francisco Bay (TI and Yerba Buena Island), approximately midway between the City of San Francisco and the City of Oakland. Building 233 is a two-story, raised floor, wood structure built in 1944. Although currently not in use, the building was used as the Radiation Safety School beginning in 1947. The 1,745.65-square-meter (18,790-square-foot) building has classrooms, offices, and laboratories.

A radium spill took place in the first floor laboratory in January 1950. Radium contamination from a capsule containing radium sulfate was spread throughout most of the building before the spill was discovered. Students directly involved in the spill were sent to a second floor classroom for monitoring and to the washroom for decontamination of hands and shoes. The limited amount of liquid generated during this initial decontamination of students was most likely washed down the drain. The building was secured and the Navy Radiological Defense Laboratory (NRDL) was called on-site. The NRDL established a decontamination station across the street from Building 233 where waste generated from decontamination was collected for off-site disposal. Decontamination of the building was accomplished using chemical and dry methods and required removal of floor coverings and portable furniture, and destructive procedures to completely decontaminate wooden and cement floors. Monitoring inside the building revealed high levels of airborne radon and airborne alpha radiation contamination for weeks after the spill. Nine months after the spill, decontamination of the building was completed, and it was released for use again.

Due to the radium spill and the subsequent decontamination of personnel and the building, the potential for residual radioactivity in the drainage system exists. Scoping surveys were conducted as recommended by the TI Historical Radiological Assessment (Naval Sea Systems Command [NAVSEA], 2006) and using guidance from the *Multi-Agency Radiation Survey and Site Investigation Manual* (Department of the Navy [DoD] et al., 2000). Scoping surveys were conducted to identify general levels and extent of contamination.

Measurement locations at Building 233 were those deemed to have the highest potential for residual radioactivity and for providing an indication of the extent of radioactivity remaining in the drainage system. The primary objectives of the scoping survey were to:

- Perform a preliminary contamination assessment
- Identify radionuclide contaminants
- Assess general levels and extent of radionuclide contamination

A total of 45 locations were surveyed and sampled. Most of the locations did not have a sufficient quantity of sediment to permit collection of samples for off-site laboratory analysis. Only six sediment samples were collected. All locations were swipe sampled, and a gamma (γ) radiation measurement was taken, except for a manhole due to access limitations. Of the 45 investigation points, 4 were located in the sewer lines, 1 was located in the nearest downstream manhole, 24 were located in sink drains, 8 were located in floor drains, 1 was located in a shower drain, 2 were located in urinal drain traps, and 5 were located in wall vents. No activity was found above background at any location by the swipe sample or γ radiation measurement. Alpha, beta, and γ static measurements were collected from 44 locations throughout the building. None of the measurements exceeded the investigation levels.

Indications of residual radioactivity were deemed significant if the level exceeded 1.0 picocurie per gram (pCi/g). Of the locations surveyed, only the two sediment samples collected from the common waste drain piping system outside the building indicated the presence of residual radioactivity. Gamma spectroscopy analysis of the sediment samples resulted in an average radium-226 concentration of 1.1 pCi/g. The sediment sample collected from the manhole downstream of the common waste drain piping system did not indicate the presence of residual radioactivity. Therefore, detectable residual radioactivity appears to be limited to the drain lines from where they tie into the common waste drain piping system to the building.

Building 233 is planned for demolition as part of the TI redevelopment. The scoping survey has indicated that at least some of the building piping is radiologically impacted; however, the building is no longer in use and the piping is a closed system and poses no hazard to the public in its current condition. It is recommended that the piping be removed and fully surveyed for release during building demolition. If the survey indicates that the piping can not be free released, then it will be managed as radiologically impacted material. The piping will be disposed of appropriately.

1.0 SITE DESCRIPTION AND BACKGROUND

This section provides information on the site and site location, prior historical site use, the radionuclide of concern (ROC), and report objectives.

1.1 SITE LOCATION AND DESCRIPTION

Naval Station Treasure Island (NAVSTA TI) is located on two islands, Treasure Island (TI) and Yerba Buena Island (YBI), in San Francisco Bay. Both islands are located approximately midway between the City of San Francisco and the City of Oakland (Figure 1-1). TI is a man-made island approximately 32.4 square kilometers (km^2) (403 acres) in size connected by a man-made causeway to the 0.69-km^2 (170-acre) YBI, which is a natural island.

Building 233 is located in the eastern portion of TI in the block bordered by 3rd and 4th Streets. Figure 1-2 shows the location of Building 233 on TI. Building 233 is a two-story, raised floor, wood structure built in 1944. The 1,745.65-square-meter (m^2) (18,790-square-foot [ft^2]) building has classrooms, offices, and laboratories. Figure 1-3 shows the layout of Building 233.

1.2 PRIOR HISTORICAL USE

The first documented use of radioactive materials on NAVSTA TI began in 1947. Building 233 was used for training Naval personnel in the use and maintenance of radiation detection, identification, and computation instruments. There are no known current uses of licensed or unlicensed radioactive materials at NAVSTA TI.

A radium spill took place in the first floor laboratory (Room 121) of Building 233 in January 1950. Radium contamination from a capsule containing radium sulfate was spread throughout most of the building before the spill was discovered. The building was secured, and the scheduled classes were suspended and reassigned. Students directly involved in the spill were sent to a second floor classroom for monitoring and to the washroom for decontamination of hands and shoes. Decontamination of hands and shoes was performed using water, an abrasive detergent, and scrubbers. The liquid generated by the decontamination was most likely washed down the drain. Decontamination of the building required removal of floor coverings and portable furniture, and destructive procedures to completely decontaminate wooden and cement floors. Monitoring inside the building revealed high levels of airborne radon and airborne alpha (α) radiation contamination for weeks after the spill. All but five of the rooms in the building were contaminated. These rooms had been closed at the time of the spill. Nine months after the spill, decontamination of the building was completed, and it was released for use again.

1.3 RADIONUCLIDES OF CONCERN AND RADIATION CHARACTERISTICS

Radium-226 (^{226}Ra) is the primary ROC as proven by gamma (γ) spectroscopy analysis of drain line samples. Table 1-1 lists the primary radiation properties: principal types of radiation and the associated half-life.

1.4 REPORT ORGANIZATION

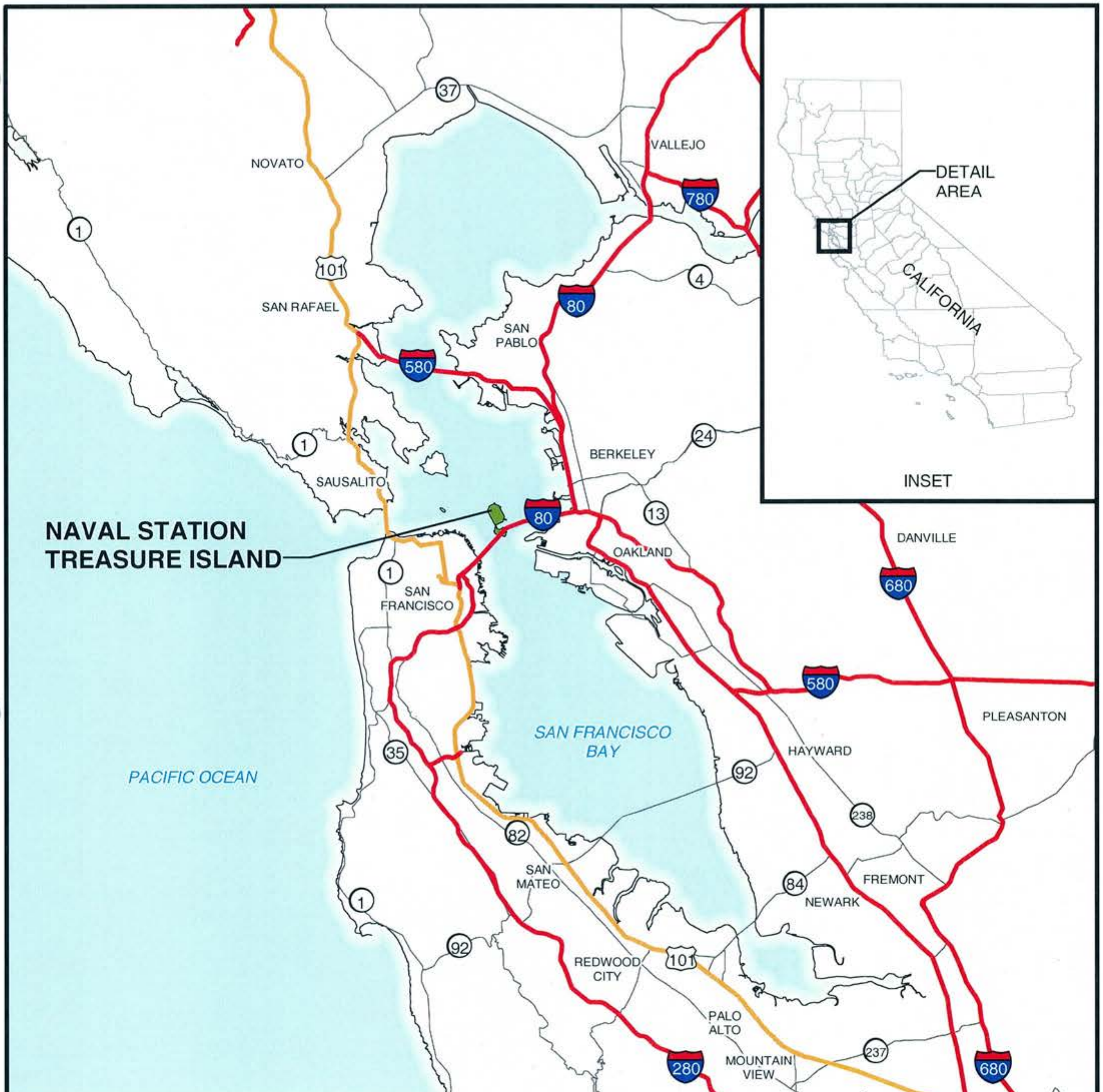
This report details the procedures and results of the scoping surveys performed in Building 233. Appendices A and B provide survey instrumentation data and instrument calibration documentation. Appendix C presents field measurements. Appendix D presents the off-site gamma spectroscopy laboratory data quality control (QC) evaluation. Appendix E is a photographic library of activities at Building 233.

8.0 CONCLUSION

A total of 45 locations were surveyed and sampled. Most of the locations did not have a sufficient quantity of sediment to permit collection of samples for off-site laboratory analysis. Only six sediment samples were collected. All locations were swipe sampled, and a γ radiation measurement was taken, except for the manhole due to access limitations. Of the 45 investigation points, 4 were located in the sewer lines, 1 was located in the nearest downstream manhole, 24 were located in sink drains, 8 were located in floor drains, 1 was located in a shower drain, 2 were located in urinal drain traps, and 5 were located in wall vents. No activity was found above background at any location by the swipe sample or γ radiation measurement. At 44 locations throughout the building, α, β, and γ static measurements were collected. None of the measurements exceeded the investigation levels.

Of the locations surveyed, only the two sediment samples collected from the common waste drain piping system outside the building indicated the presence of residual radioactivity. Gamma spectroscopy analysis of the sediment samples indicated ^{226}Ra concentrations above 1.0 pCi/g. The sediment sample collected from the manhole downstream of the drain line did not indicate the presence of residual radioactivity. Therefore, detectable residual radioactivity appears to be limited to the drain lines from where they tie into the common waste drain piping system to the building.

Building 233 is planned for demolition as part of the TI redevelopment. The scoping survey indicated that the common waste drain piping system beneath the building is radiologically impacted. The scoping survey indicated the remaining piping in the building is not radiologically impacted. The building is no longer in use, and the piping is a closed system and poses no hazard to the public in its current condition. It is recommended the portion of the piping which is radiologically impacted be fully surveyed prior to demolition of the building. Once the extent and amount of impacted piping is determined, the decision will be made whether the piping can be free released or will be managed as radiologically impacted material.



LEGEND

- 1 STATE HIGHWAY
- 101 US HIGHWAY
- 280 INTERSTATE HIGHWAY
- TREASURE ISLAND
- WATER

4 0 4 8 Miles

Scale: 1" = 8 Miles

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

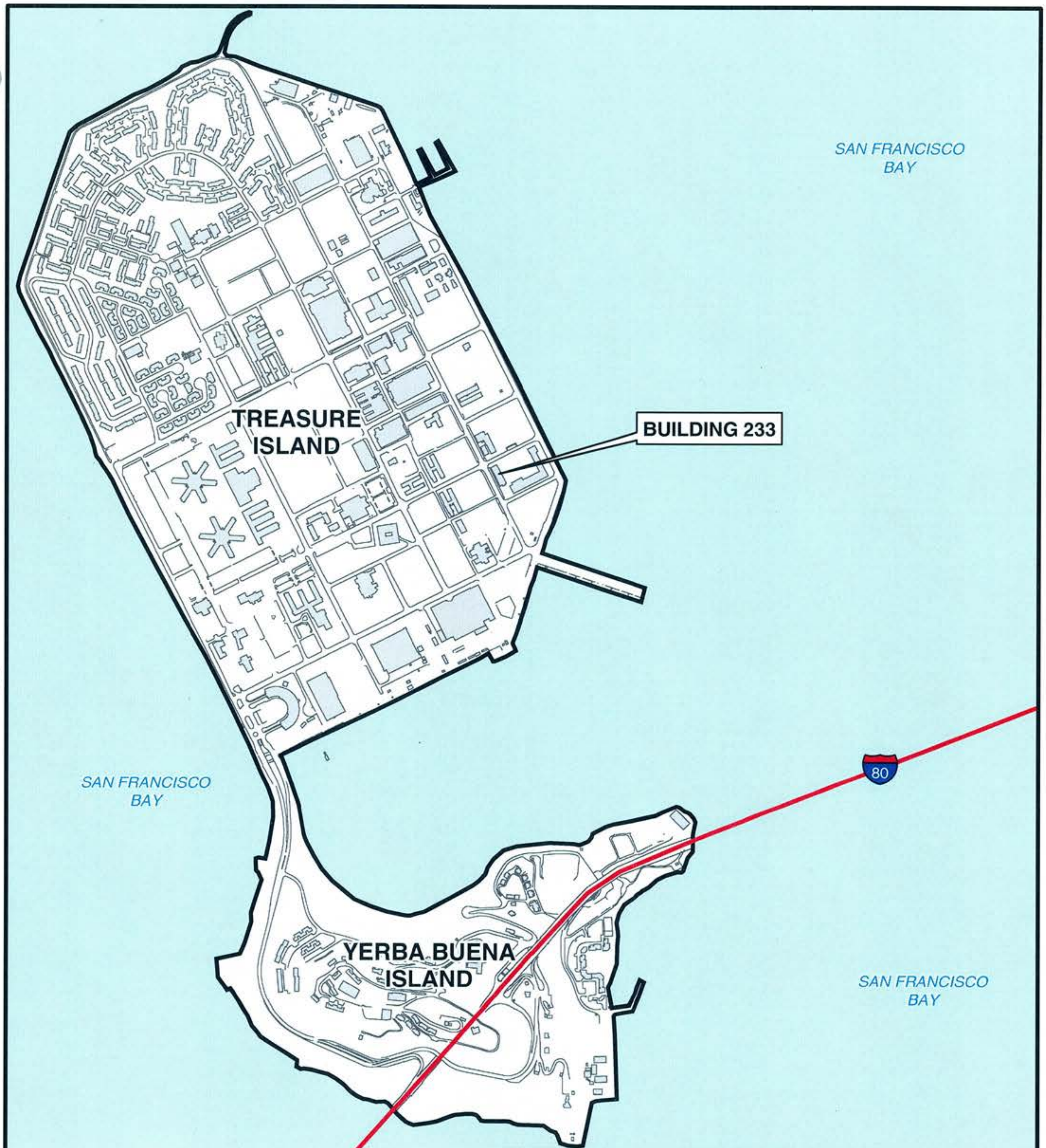
SCOPING SURVEY REPORT
FOR BUILDING 233 DRAIN LINES AND WALL VENTS

FIGURE 1-1

REGIONAL LOCATION MAP
NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 2
AUTHOR: GFG
DCN: ECSD-2201-0021-0009
FILE NUMBER: 080090R2171.mxd

TETRA TECH EC, INC.



LEGEND

80 INTERSTATE HIGHWAY

NAVAL STATION TREASURE ISLAND BASE BOUNDARY

600 0 600 1,200 Feet

Scale: 1" = 1200'

N

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

SCOPING SURVEY REPORT
FOR BUILDING 233 DRAIN LINES AND WALL VENTS

FIGURE 1-2

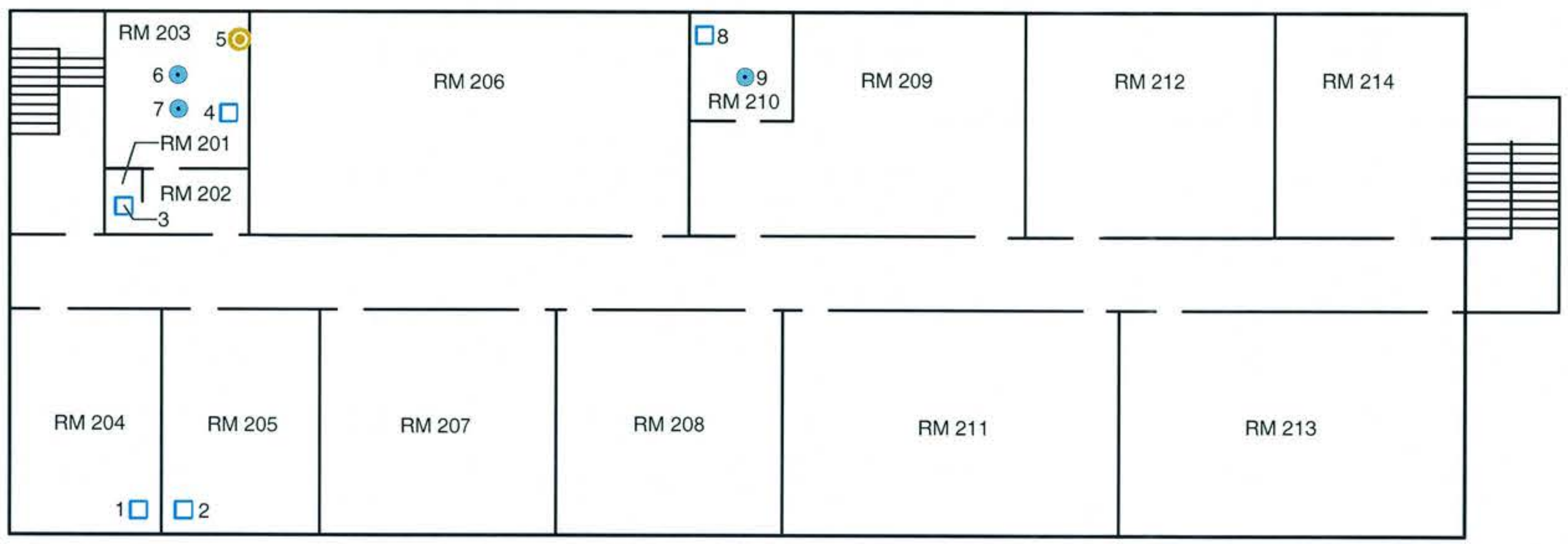
SITE LOCATION MAP

NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

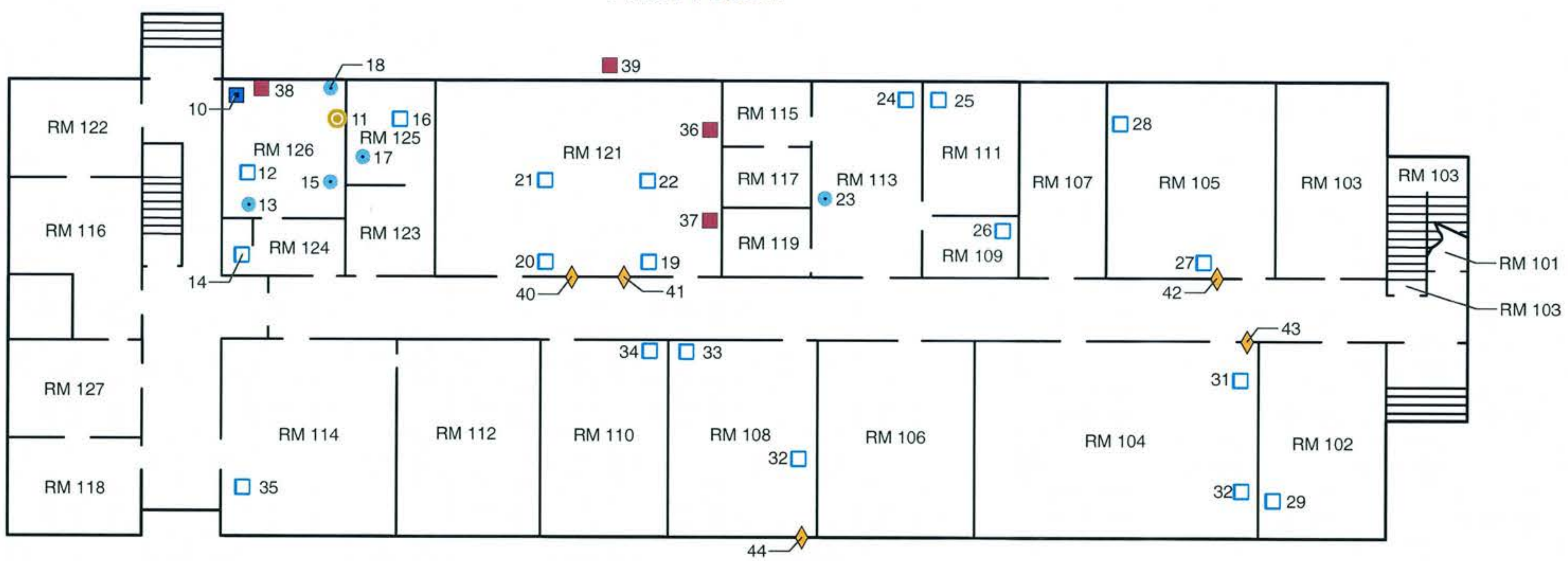
REVISION: 2
AUTHOR: GFG
DCN: ECSD-2201-0021-0009
FILE NUMBER: 080090S2174.mxd

TETRA TECH EC, INC.

SECOND FLOOR



FIRST FLOOR



LEGEND

	FLOOR DRAIN
	SEWER LINE
	SHOWER DRAIN
	SINK DRAIN
	URINAL DRAIN TRAP
	WALL VENT
28	LOCATION IDENTIFICATION NUMBER

NOTES:

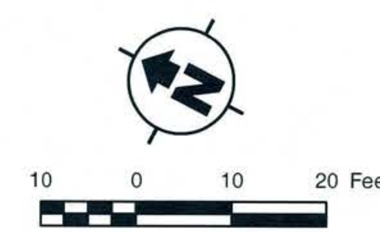
WIPES WERE TAKEN IN ALL OF THE DRAINS AND PIPES AND 2 MINUTE ALPHA/BETA STATICS WERE PERFORMED.

GAMMA STATICS WERE TAKEN DIRECTLY ON DRAINS AND PIPES.

SMEARS WERE TAKEN ON INSIDE OF PIPES AND DRAINS.

ONLY SMEARS WERE OBTAINED FROM THE VENTS.

RM - ROOM



Scale: 1" = 20'

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

SCOPING SURVEY REPORT
FOR BUILDING 233 DRAIN LINES AND WALL VENTS

FIGURE 1-3

BUILDING 233 FLOOR PLAN WITH SCAN LOCATIONS

NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

REVISION: 0
AUTHOR: GFG
DCN: ECSD-2201-0021-0009
FILE NUMBER: 080090L2042.mxd

TETRA TECH EC, INC.

LEGEND

MANHOLE

SEWER LINE

SINK DRAIN

021-001-MH 0.820 SAMPLE ID FOR GAMMA SPEC, EPA 901.1M AND GAMMA COUNT (pCi/g)

NOTES:

EPA - ENVIRONMENTAL PROTECTION AGENCY

pCi/g - PICOCURIE PER GRAM

RM - ROOM

10 0 10 20 Feet

Scale: 1" = 20'

BASE REALIGNMENT AND CLOSURE
PROGRAM MANAGEMENT OFFICE WEST
SAN DIEGO, CALIFORNIA

SCOPING SURVEY REPORT
FOR BUILDING 233 DRAIN LINES AND WALL VENTS

FIGURE 3-1

BUILDING 233 FLOOR PLAN WITH SEDIMENT SAMPLE LOCATIONS

NAVAL STATION TREASURE ISLAND
SAN FRANCISCO, CALIFORNIA

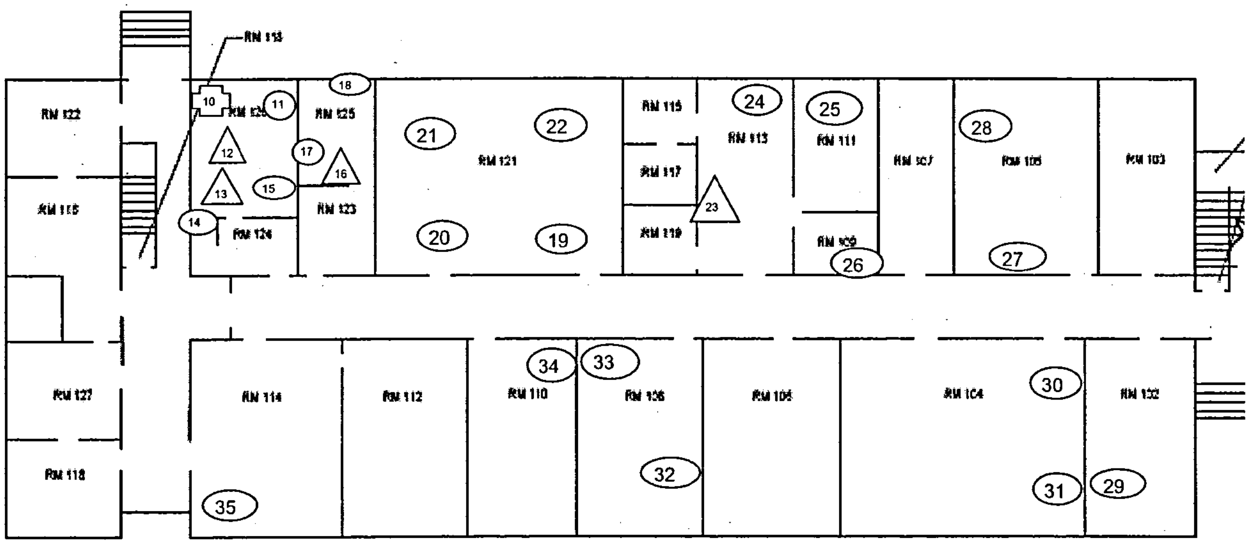
REVISION: 0
AUTHOR: GFG
DCN: ECSD-2201-0021-0009
FILE NUMBER: 080090L2615.mxd

TETRA TECH EC, INC

RADIATION/CONTAMINATION SURVEY FORM   Page 1 of 3

	INSTRUMENTATION USED						
Date: Time: 9/24/2007 09:00	Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA⁺ (dpm/100cm^2)	Background⁺ (dpm/100cm^2)
Survey Number: RSRS-Bldg-233-pipes-092407							
Location: Building 233	2360 43-68	177117 95526	8/28/2008	α 29.50% βγ 34.55%	α 7.38% βγ 8.64%	α 51.53 βγ 351.56	α 10.76 βγ 1148.55
Surveyor: S.Rolfe/T.Standfuss	2929	182585	4/16/2008	α 66.90% βγ 54.20%	α 16.73% βγ 13.55%	α 4.33 βγ 43.32	α 2.99 βγ 517.34
Reviewed By:	2350-1 44-10	126182 230620	8/28/2008				5426 Kcpm
Isotopes of Concern: ^{226}Ra ^{137}Cs							
Survey Type: Building Release	2360 Static Count Time: 2 Minutes				2350 Static Count Time: 1 Minute		
Description of survey: Pipes and Drain Lines							

FIRST FLOOR



Comments:

○	Urinal Drain Trap
⬭	Sink Drain
△	Floor Drain
✚	Shower Drain

Wipes were taken in all of the drains and pipes and 2 min. alpha/beta statics were performed.

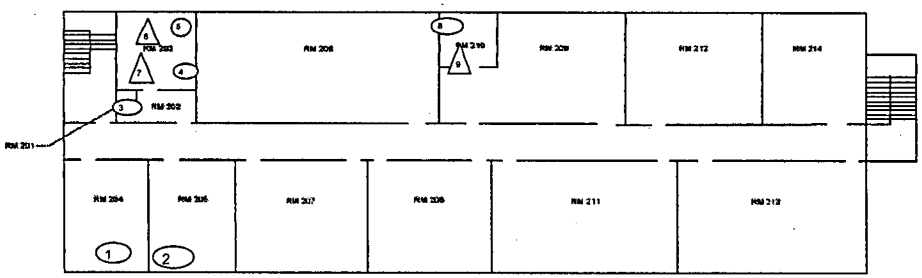
Gamma ststics were taken directly on drains and pipes.

Smears were taken on inside of pipes and drains.

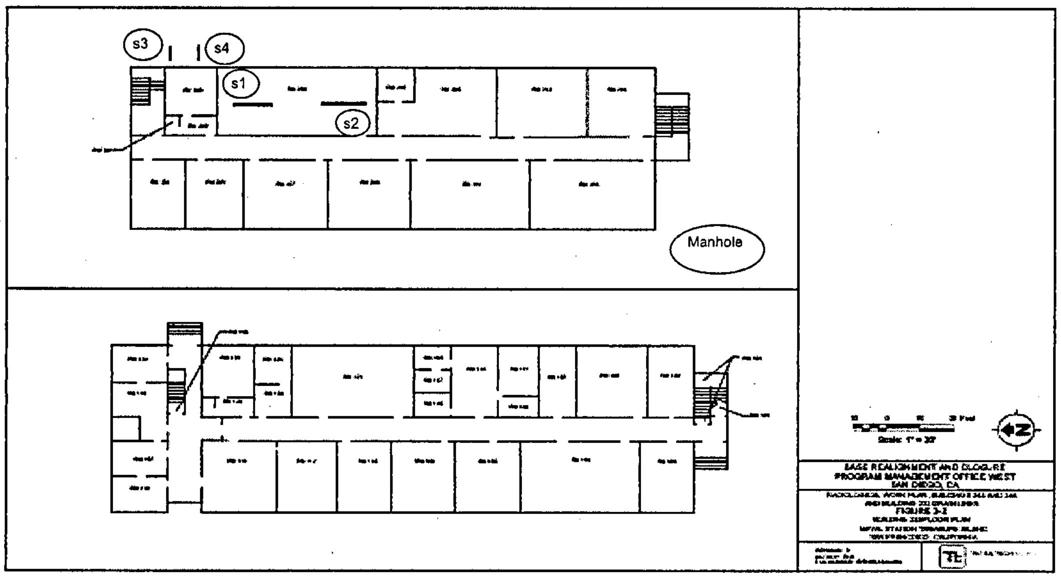
See Photo Page for 1-9 on second floor and Sewer lines.

(#) Shape denotes swipe location or fixed α/β readings
<u>#</u> denotes G/A radiation readings
<u>#/#</u> denotes contact / 1 meter radiation readings.
* denotes highest radiation reading on contact
⁺ Unless Otherwise Noted
All readings in μR/hr unless otherwise noted

SECOND FLOOR



Legend: Urinal Trap
Sink Drain
Floor Drain



RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: RSRS-Bldg-233-pipes-092407

SURVEYOR: S.Rolfe/T.Standfuss | LOCATION: Building 233

Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	Alpha dpm/100cm²	Beta/Gamma dpm/100cm²	
1			3587	-10.76	-211.33	-0.75	-19.25	
2			3862	0.00	-220.52	-0.25	-18.63	
3			3926	-5.38	-289.44	-0.75	-17.40	
4			3947	-10.76	-188.36	0.25	-7.56	
5			4155	0.00	-257.28	-0.75	-9.41	
6			3101	0.00	-271.06	-0.75	-12.48	
7			4166	0.00	-234.31	-0.75	-13.71	
8			4087	-10.76	-468.61	-0.75	-17.40	
9			2704	10.76	-390.51	-0.25	-12.48	
10			6018	-10.76	-27.57	0.25	-15.56	
11			5562	-10.76	-36.75	-0.25	-24.78	
12			8457	-10.76	-55.13	-0.75	-32.16	
13			5497	-5.38	-87.29	0.25	-24.78	
14			5017	0.00	-4.59	-0.25	-24.17	
15			5908	0.00	-78.10	-0.75	-29.70	
16			4805	-10.76	-101.07	-0.25	-14.94	
17			5216	-10.76	18.38	-0.75	-11.25	
18			5553	5.38	-64.32	-0.75	-18.02	
19			5447	-10.76	-110.26	-0.75	-28.47	
20			5351	-10.76	-59.72	0.25	-13.71	
21			5667	-10.76	-248.09	-0.25	-18.02	
22			5920	-5.38	-206.74	-0.75	-20.48	
23			6121	-10.76	0.00	-0.75	-25.40	
24			5128	0.00	-119.45	-0.25	-45.08	
25			5234	0.00	-229.71	-0.75	-5.72	
26			5218	-10.76	-252.68	-0.75	-29.09	
27			5929	-5.38	-160.80	-0.75	-11.25	
28			5485	-10.76	-165.39	-0.75	-21.71	
29			4826	-10.76	-87.29	-0.75	-22.32	
30			5286	-5.38	-229.71	-0.25	-25.40	
31			5351	0.00	-128.64	0.75	4.74	
32			4692	0.00	-156.20	-0.75	-10.02	
33			5155	0.00	-294.03	-0.75	-16.79	
34			4781	-10.76	-211.33	-0.25	-23.55	
35			4567	-5.38	-202.15	-0.75	-18.63	

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: RSRS-Bldg-233-pipes-092407

SURVEYOR: S.Rolfe/T.Standfuss

LOCATION: Building 233

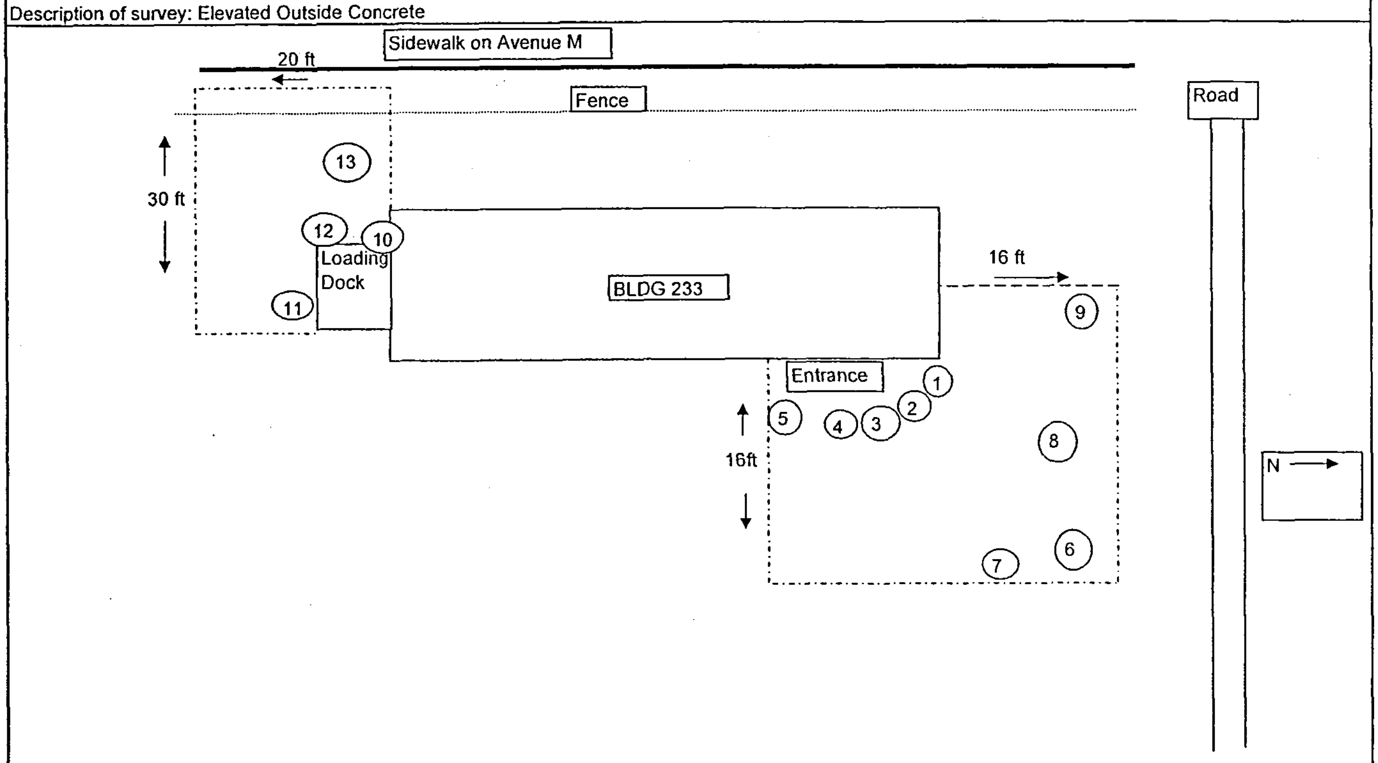
Location	Exposure Rate (µR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
36			5541	-10.76	-64.32	1.25	-13.10	
37			5635	-10.76	-335.38	-0.75	-25.40	
38			6680	0.00	-179.17	0.25	-15.56	
39			5332	-5.38	-280.25	-0.75	-6.95	

Reviewer	Date: 9/30/2007	RSO/RTM	Date: 9/30/2007
	Time:		Time:

RADIATION/CONTAMINATION SURVEY FORM

Date: Time: 9/27/2007 09:00	INSTRUMENTATION USED						
	Model Inst/Det.	Serial Number	Calibration Due Date	Instrument % Efficiency	Total % Efficiency	MDC/MDA + (dpm/100cm²)	Background + (dpm/100cm²)
Survey Number: RSRS-Bldg-233-Outside Concrete							
Location: Building 233							
Surveyor: S.Rolfe/T.Standfuss							
Reviewed By: B Henderson	2350-1 44-10	126182 230620	8/28/2008				5710 Kcpm
Isotopes of Concern: ^{226}Ra							
Survey Type: Building Release	2360 Static Count Time: N/A Minutes				2350 Static Count Time: 1 Minute		

Description of survey: Elevated Outside Concrete



Comments:

Only Gamma Scans and Statics were performed.

Elevated readings were found in all of the lined out areas including area outside fence. Gamma scans were 9-12 Kcpm.

(#) Shape denotes swipe location or fixed gamma readings

# denotes G/A radiation readings

#/# denotes contact / 1 meter radiation readings.

* denotes highest radiation reading on contact

\+ Unless Otherwise Noted

All readings in μR/hr unless otherwise noted

RADIATION/CONTAMINATION SURVEY SUPPLEMENT

SURVEY NUMBER: RSRS-Bldg-233-Outside Concrete-092707

SURVEYOR: S.Rolfe/T.Standfuss

LOCATION: Building 233

Location	Exposure Rate (μR/hr)		Fixed + Removable (NET)			Removable (NET)		Comments
	Contact	1 Meter	Gamma (cpm)	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	Alpha dpm/100cm^2	Beta/Gamma dpm/100cm^2	
1			53639					
2			30722					
3			19564					
4			28782					
5			15203					
6			21408					
7			22300					
8			34665					
9			16563					
10			24104					
11			66844					
12			55102					
13			77944					

Reviewer	Date: 9/28/2007 Time: 1710	RSO/RTM	Date: September 28, 2007 Time: 1740
[signature]		[signature]	

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AD-C18(CH)
Memorandum

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AUTHORITY: US Naval Radiological Def. Lab. letter dtd 24 June 57

AD 896878

NAVAL RADIOLOGICAL DEFENSE LABORATORY

SAN FRANCISCO NAVAL SHIPYARD
SAN FRANCISCO 24, CALIF.

NRDL

NS 068-001

HAZARD EVALUATION AND CONTROL FOLLOWING A SPILL OF 40 MILLIGRAMS OF RADIUM

R. K. Skow, S. R. Johns, F. L. Falgiano, and F. R. Holden

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14) USNRDL-AD-218(OH)

(6)

HAZARD EVALUATION AND CONTROL FOLLOWING A SPILL OF 40 MILLIGRAMS OF RADIUM.

(10) R. K./Skow, S. R./Johns, F. L./Falgiano [redacted] F. R./Holden

(9) Preliminary Report.,

Health Physics Branch
F. R. Holden, Chief

(16) NS-088-001

Problem Assignment 1095B

Scientific Director
William H Sullivan

NAVAL RADIOLOGICAL DEFENSE LABORATORY
San Francisco Naval Shipyard
San Francisco 24, Calif.

(11) 12 Apr [redacted] 60 (12) 20p.

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Date issued: 12 September 1950

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NAVAL RADIOLOGICAL DEFENSE LABORATORY
SAN FRANCISCO NAVAL SHIPYARD
SAN FRANCISCO 24, CALIFORNIA

MEMORANDUM

From: Health Physics Branch
To: Scientific Director

Subj: Hazard evaluation and control following a spill of 40 milligrams of radium

1. See attached report.

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ABSTRACT

During a laboratory exercise in the calibration of radiac instruments at the Damage Control Training Center, U. S. Naval Station, Treasure Island, California, 40.3 mg of radium was accidentally spilled. The spill was undetected for approximately 30-60 minutes, during which time the radium salt was spread widely throughout the building.

This report is an account of the evaluation and control of the health hazard from the accident. Attention is directed to AD-219(CE), which describes the procedures used and the results obtained in the reclamation of the school building.

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HAZARD EVALUATION AND CONTROL FOLLOWING A SPILL OF 40 MILLIGRAMS OF RADIUM

R. K. Skow, S. R. Johns, F. L. Falgiano, and F. R. Holden

INTRODUCTION

During the afternoon of 17 January 1950 the Radiological Safety Class at the Damage Control Training Center, Building 233, U. S. Naval Station, Treasure Island, California, was engaged in a calibration exercise with radiac instruments. The experiment was the calibration of IM3PD Ion Chambers, high intensity meters; hence about 500 mg of radium was used as a radiation source.

The radium sources consisted of several capsules, including one 40.3-mg source, encased in a metal cylinder with screw plugs at each end. When the 40.3-mg cylinder was removed from its storage container, the bottom screw plug fell undetected into the container. The radium capsule stuck in the cylinder for an indeterminate time period and then fell to the floor.

As the radium capsule was not detected on the floor it was stepped on by one or more of the experimenters. After approximately 30-60 minutes it was noticed that the calibration data were erratic.

Several of the instruments were taken to the repair shop to be checked for response. It was also suspected that radon might have leaked from one of the capsules, so an inspection was made.

The investigations showed that the 40.3-mg radium source had spilled and that it was spread throughout the building. The students were immediately monitored and it was found that their hands, clothing, and shoes were badly contaminated.

The Commander of the Damage Control School called the Naval Radiological Defense Laboratory and requested that assistance be provided in hazard evaluation and control and in the decontamination of the building.

THE SITUATION - 16 HOURS AFTER THE SPILL

NRDL personnel found widespread contamination and an emergency task force of representatives from the Chemistry, Engineering Applications, and Health Physics Branches was assembled to cope with the problem.

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A. Personnel Contamination

1. Bodies

A number of the students had microgram amounts of radium on the backs and palms of their hands. Routine cleansing and scrubbing procedures had been attempted immediately after detection but they were only partially successful. The hair and the legs of the students were also commonly contaminated.

2. Clothing

Uniforms and shoes worn by the Damage Control School personnel were all heavily contaminated. Alpha counts as high as 200,000 d/m were common.

3. Automobiles, Homes, etc.

Personal property of the students, such as their automobiles and their homes was also badly contaminated. All surfaces normally contacted by the hands and feet were affected.

In automobiles the flooring, the foot pedals, and steering wheel were most generally radioactive. Alpha activity was frequently of the order of 200,000 d/m.

It was possible to track the students into their homes by means of radiac instruments. Carpets, bathroom fixtures, and furniture were contaminated to various degrees. Table I provides data from one investigation.

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TABLE I

Radioactive Contamination of Objects in the Home of One Damage Control School Student

Object	Alpha Activity[a] (d/m)
Door Knob	1500
Towel	3000
Pillow	4000
Water Faucet	125
Bed Spread	1700
Carpet	2300
Armchair	2700
Writing Desk	3000
Slippers	275
Chair Seat	4000
Pencil	1500
Shoes	20,000+
Clothes Brush	1500
Raincoat	4500

[a] Measurements were made with a gas flow, proportional counting instrument.

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B. Building Contamination

The extent of contamination found in the Damage Control School Building has previously been described by the Engineering Applications Branch of NRDL.* In general, the contamination was widely spread but most of the radium was located in the calibration room, the repair shop, the hallways, and some of the offices. Only five rooms were found to be free from contamination.

PERSONNEL DECONTAMINATION

A. Bodies

The procedures employed to decontaminate body surfaces of the students were those developed by the Chemistry Branch of NRDL. The Appendix** describes the methods employed and their effectiveness in decontamination. In general, the results were excellent and all personnel were decontaminated to satisfactory levels.

B. Clothing

In many instances personal clothing could not be decontaminated satisfactorily. This was true of wool clothing such as uniforms which could not be laundered. Where the contamination was low, vacuum cleaning frequently removed the radium to leave residues with activity less than 400 d/m per 150 cm^2.

Cotton clothing and other washable fabrics were in most cases cleaned satisfactorily by NRDL standard laundry procedures.***

Shoes were cleaned by scrubbing the contaminated surfaces with the decontaminating solution described in the Appendix. Repeated use of the scrubbing procedures gave uniformly successful results.

C. Homes, Automobiles, etc.

Floor mats, seat covers, and other similar permeable fabrics could not be satisfactorily decontaminated and in most instances they were discarded as

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* AD-219(OE), NRDL, Decontamination of Building 233, U. S. Naval Station, Treasure Island, California (Confidential).

** NRDL Skin Decontamination Operations at U. S. Naval Station, Treasure Island, California.

*** AD-136(H), NRDL, Rules and Procedures for Radiological Safety.

radioactive waste. Hard surfaces, such as steering wheels, were cleaned by repeated use of the skin decontaminating solution.

Homes and personal effects also were cleaned by repeated use of surface abrading agents, solutions, and vacuum techniques. (See AD-219(OE))

BUILDING DECONTAMINATION

This subject is covered extensively in the companion report AD-219(OE). A summary of the cleaning methods used in the Treasure Island radium spill is given below.

A. Dry Methods

Experience of the Health Physics Branch of NRDL shows that loosely bound particulate radioactive material can be removed quantitatively by suction. The device commonly employed is a Hild vacuum cleaner equipped with an Army Chemical Corps Type 6 collective protector on the exhaust from the water tank.

The machine has strong suction and most coarse material is deposited in water in the collecting tank. The tank is lined with a strippable coating and it is easy to remove the deposited contaminants from the tank. Finely divided dust collects quantitatively on the type 6 filter. The filter may be replaced rapidly when it becomes heavily contaminated.

The NRDL Vacuum Cleaner was used successfully to remove 35 percent of the radium from the training school building.

B. Wet Methods

Wet methods were used extensively by the Engineering Applications Branch of NRDL with good success. The procedures are described in AD-219(OE).

C. Miscellaneous

The outstanding development was the flame treatment of surfaces to erode the contaminated layers of wood and concrete flooring. The hot gases which contain radioactive fumes are removed by suction. This method has been described in detail by the Engineering Applications Branch.*

* AD-207(O), NRDL, Flame Decontamination of Unpainted Concrete and Wood (Confidential).

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AIR CONTAMINATION

Throughout all phases of the decontamination work done in the Training School Building, air analyses were made to measure concentrations of radium, radon, and radon decay products. The samples were collected by standard filter-paper techniques and analyses were made using the gas flow, proportional counter.

The data from the air analyses are presented graphically in Figures 1, 2, and 3. It is noteworthy that radon concentrations exceeded the maximum allowable concentration ($10 \mu\mu c$/liter or 630 d/m/ft.^{3}) for the first two weeks following the spill. All later measurements were below the maximum allowable concentration.

The radium dust samples exceeded the maximum allowable concentration ($5 \times 10^{-12} \mu g/cc$ or 0.33 d/m/ft.^{3}) for over one month and then remained below the safety level.

During the initial phases of the decontamination operation all personnel wore R.B.A. (Rescue Breathing Apparatus) masks to insure protection from the inhalation hazard. When the radon concentrations fell below dangerous levels and the radium dust concentrations approached permissible concentrations, personnel wore standard Navy respirators of the type approved for use against chemical agents.

WASTE DISPOSAL

The waste disposal problem was considerable; more than two-hundred barrels of waste were handled. The waste was placed in steel drums and sufficient concrete was added to insure that the drum would sink. All of the drums were stored aboard the CROSSROADS ex-target vessel, USS Independence.

CURRENT STATUS

The physical examinations and breath radon analyses made on personnel exposed during and after the radium spill disclosed no detectable damage. Notations were made on the medical records of the individuals and periodic physical examinations are to be conducted to detect any latent effects.

The Damage Control School Building has received final clearance since all significant contamination was removed. The building was reoccupied on a normal operational basis approximately six months after the accident occurred.

All personal effects, homes, and automobiles were completely decontaminated within the first few days after the spill.

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RECOMMENDATIONS

The following recommendations are made to prevent a reoccurrence of the radium spill and to minimize the hazard, if such a spill should occur again:

A. All radium sources should be contained in hermetically sealed capsules. The capsules should be inspected for leakage periodically.

B. Wherever practical, solid metal cobalt 60 sources should replace radium. Cobalt 60 is cheaper, and it has no significant danger as a spreading contaminant. The half-life of cobalt 60 (5.3 years) is short compared to that of radium, but the inconvenience of decrease in activity with time is not excessive.

C. Whenever radioactive sources such as radium or cobalt 60 are removed from their storage containers, a monitor should follow the operation with an instrument such as the "cutie pie."

D. If people become contaminated by radioactive materials, they should be held at the site or the base until they can be decontaminated.

E. A mobile radiac laboratory of the type described in AD-204(Z)* would seem to have application within the Military Establishment for the control of radioactive contamination.

R.K. Skow

R. K. Skow

Approved by:

F.R. Holden

F. R. Holden
Chief, Health Physics Branch

* AD-204(Z), NRDL, A Mobile Radiac Laboratory (Confidential).

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NAVAL RADIOLOGICAL DEFENSE LABORATORY
SAN FRANCISCO NAVAL SHIPYARD
SAN FRANCISCO 24, CALIFORNIA

24 January 1950

MEMORANDUM

To: C. R. Schwob, Chief, Chemistry Branch
From: S. W. Mayer, Chemistry Branch

Subj: NRDL Skin Decontamination Operations at U. S. Naval Station, Treasure Island, California.

1. S. W. Mayer, in association with H. F. Matthiesen, carried out skin decontamination on military personnel connected with the Radiological Safety School on Treasure Island. The decontamination was carried out at the request of Dr. C. R. Schwob and under the general supervision, at Treasure Island, of Dr. F. R. Holden.

2. The military personnel had been contaminated during the early afternoon of 17 January by portions of 40 milligrams of radium chloride at the Radiological Safety School. Later in the afternoon of 17 January, the contaminated personnel had scrubbed with soap and water, and then with citric acid. However, in some cases (see Summary of Decontamination Data presented in this memorandum) portions of the skin--particularly on the hands--remained contaminated.

3. Beginning at 1300 on 19 January, decontamination of those difficult cases was carried out with the skin-decontaminating solution provided by NRDL.* The alpha contamination was measured before and after the decontamination

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* AD-118(C), NRDL, The Decontamination of Skin by Complexing Agents, Detergents, and Keratolytics (Confidential).

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treatment. The treatment consisted of scrubbing with the warm decontaminating solution for two minutes, rinsing, scrubbing an additional two minutes with the solution, and rinsing.

4. The composition of the decontamination solution was:

Trisodium Citrate*	- 3%
Triton X-100	- 0.4%
Hyamine 1622	- 0.1%

The pH of the solution was adjusted to 7. It was recommended that it be applied warm, 45°C to 50°C.

* Recent work by the Bio-Medical Branch of NRDL indicates that, under some conditions, complexing agents may permit a faster penetration of radio-isotopes through the skin barrier of test animals. Caution is therefore advised in the use of the skin decontaminating solution pending further research on this subject.

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SUMMARY OF DECONTAMINATION DATA

Student A

	Initial Contam. c/m	First Pair Scrubbings c/m	Second Pair Scrubbings c/m
Right Hand - Palm Side			
Fingertips	11,000	7,000	1,500
Palm	7,000	4,000	800
Wrist	2,000	800	400
Right Hand - Back			
Fingernails	8,000	3,000	1,500
Knuckles	8,000	3,000	1,000
Wrist	4,000	1,000	400
Left Hand - Palm Side			
Fingertips	14,000	2,000	700
Palm	14,000	2,000	700
Wrist[a]	20,000	4,000	1,000
Left Hand - Back			
Fingernails	5,000	2,000	500
Knuckles	5,000	2,000	500
Wrist[a]	12,000	2,500	700

[a] A metal-band wrist watch was contaminated heavily (off scale, i.e., more than 20,000 c/m). Apparently watches and rings (see next page) pick up activity and rub it into the skin under the band.

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SUMMARY OF DECONTAMINATION DATA (Cont.)

Student B	Initial Contam. c/m	First Pair Scrubbings c/m	Second Pair Scrubbings c/m	Third Pair Scrubbings c/m
Right Hand - Palm Side				
Fingertips	8,000	1,300	600	350
Palm	5,000	500	250	200
Wrist	3,000	400	300	200
Right Hand - Back				
Fingernails	2,000	500	400	300
Knuckles	1,000	600	400	300
Wrist	1,000	300	300	200
Left Hand - Palm Side				
Fingertips	8,000	1,200	500	400
Palm[a]	8,000	1,500	800	500
Wrist	4,000	800	300	300
Left Hand - Back				
Fingernails	5,000	1,000	500	400
Knuckles	4,000	600	400	300
Wrist	1,000	600	400	300
Left Knee	16,000	5,000	500	—[b]

[a] A gold ring was contaminated to more than 20,000 c/m. The finger, under the ring, was contaminated to 10,000 c/m. After the third pair of scrubbings, contamination was reduced to 500 c/m.

[b] Negligible.

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SUMMARY OF DECONTAMINATION DATA (Cont.)

Student C	Initial Contam. c/m	First Pair Scrubbings c/m	Second Pair Scrubbings c/m
Right Hand - Palm Side			
Fingertips	13,000	7,500	2,000[a]
Palm	5,000	2,000	500
Wrist	3,000	2,000	500
Right Hand - Back			
Fingernails	1,500	700	300
Knuckles	2,000	900	300
Wrist	1,000	500	300
Left Hand - Palm Side			
Fingertips	2,000	600	150
Palm	4,000	600	150
Wrist	900	300	100
Left Hand - Back			
Fingernails	1,000	500	150
Knuckles	1,000	500	150
Wrist	1,000	600	150

[a] A third pair of scrubbings brought the contamination on the fingertips of the right hand down to 1000 c/m.

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SUMMARY OF DECONTAMINATION DATA (Cont.)

Student D

Right palm - Contamination was reduced from 800 c/m to 200 c/m by one pair of scrubbings.

Student E

Right fingertips - Contamination was reduced from 3000 c/m to 600 c/m and then to 400 c/m by two pairs of scrubbings.

5. The reaction of Radiological Safety School personnel to the apparent success of the decontamination was very favorable.

6. In this field test the solution was at least as effective on the skin of humans as in the laboratory tests on the skin of animals.

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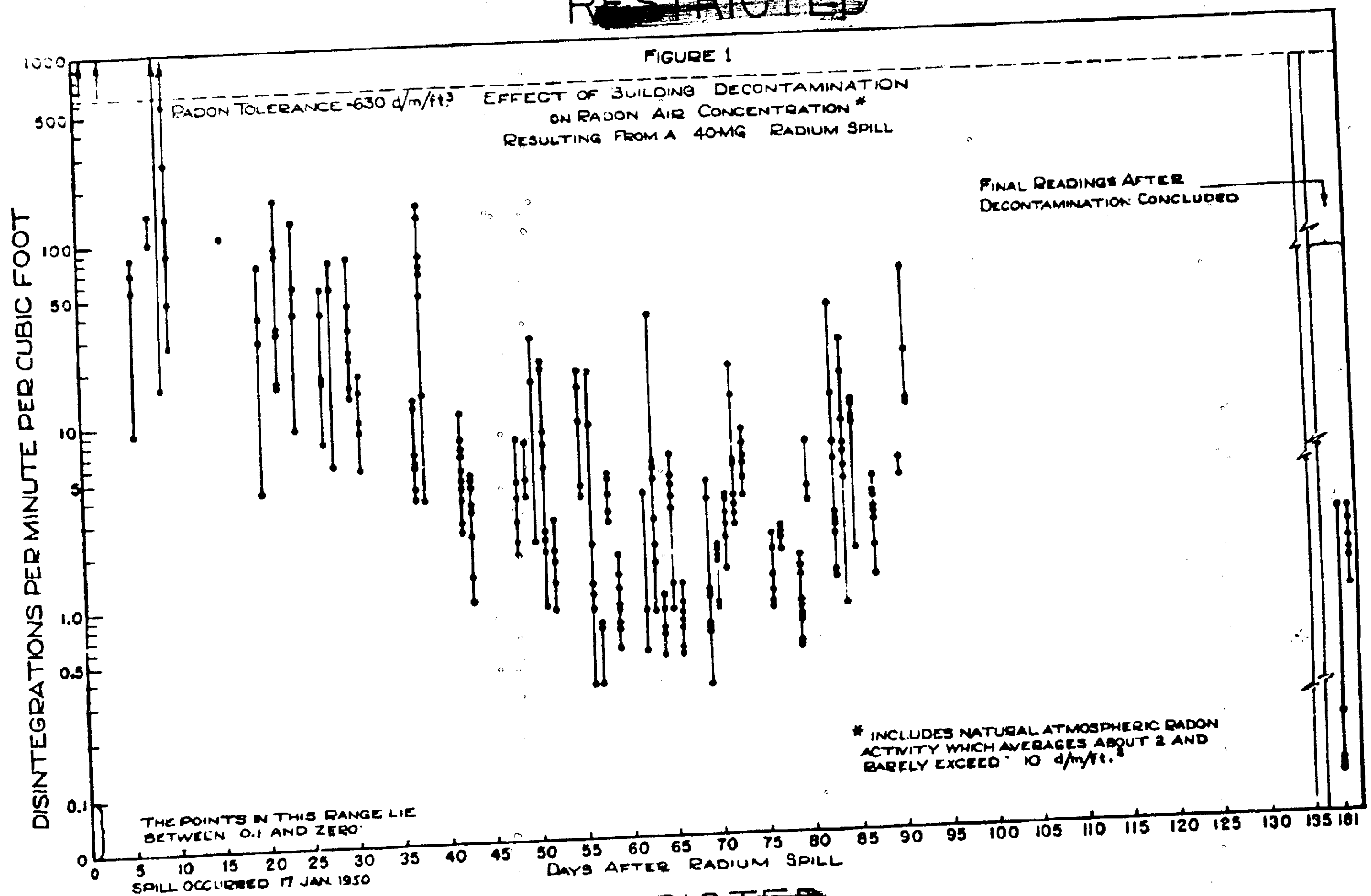

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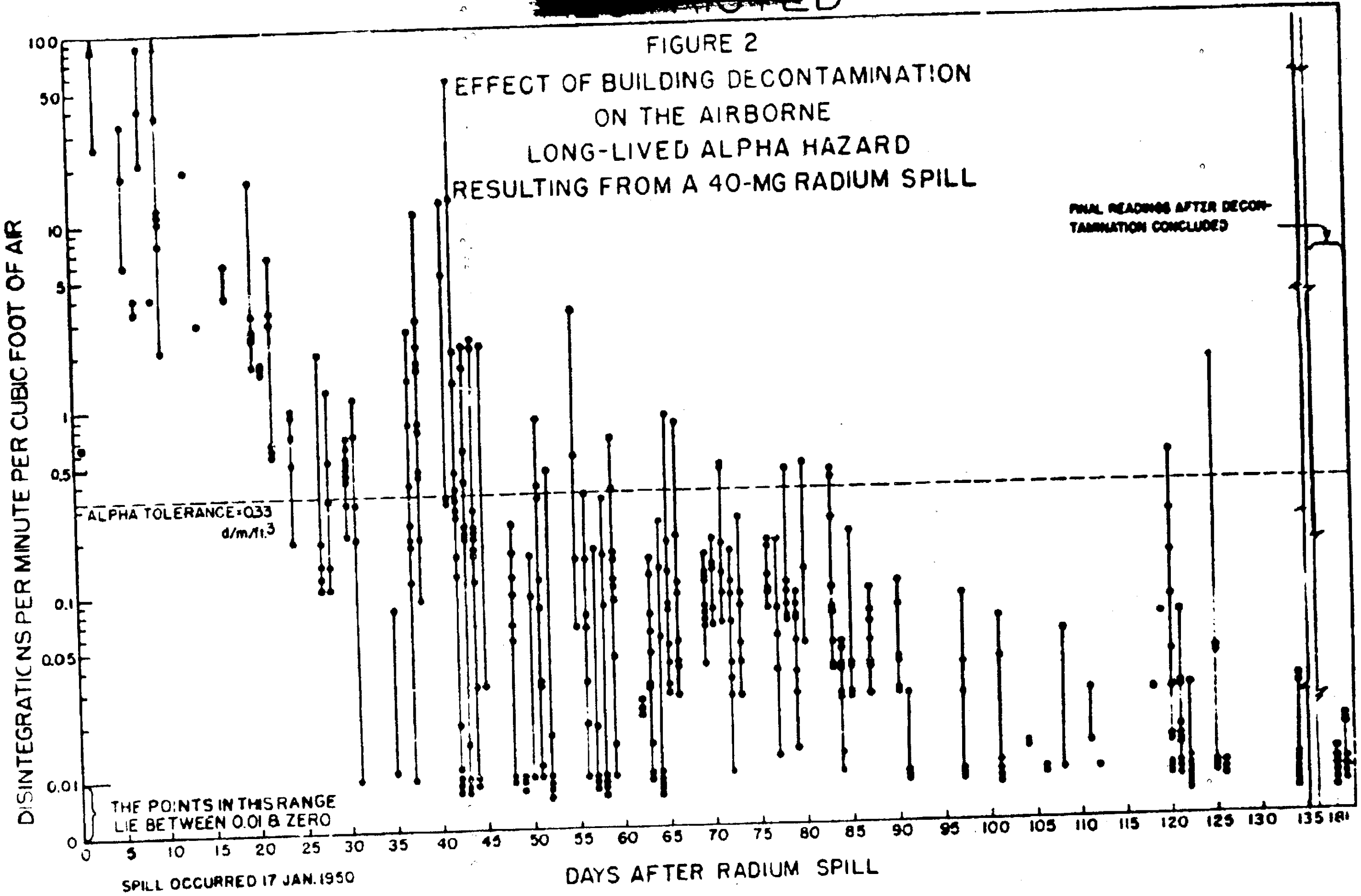

FIGURE 2
EFFECT OF BUILDING DECONTAMINATION ON THE AIRBORNE LONG-LIVED ALPHA HAZARD RESULTING FROM A 40-MG RADIUM SPILL

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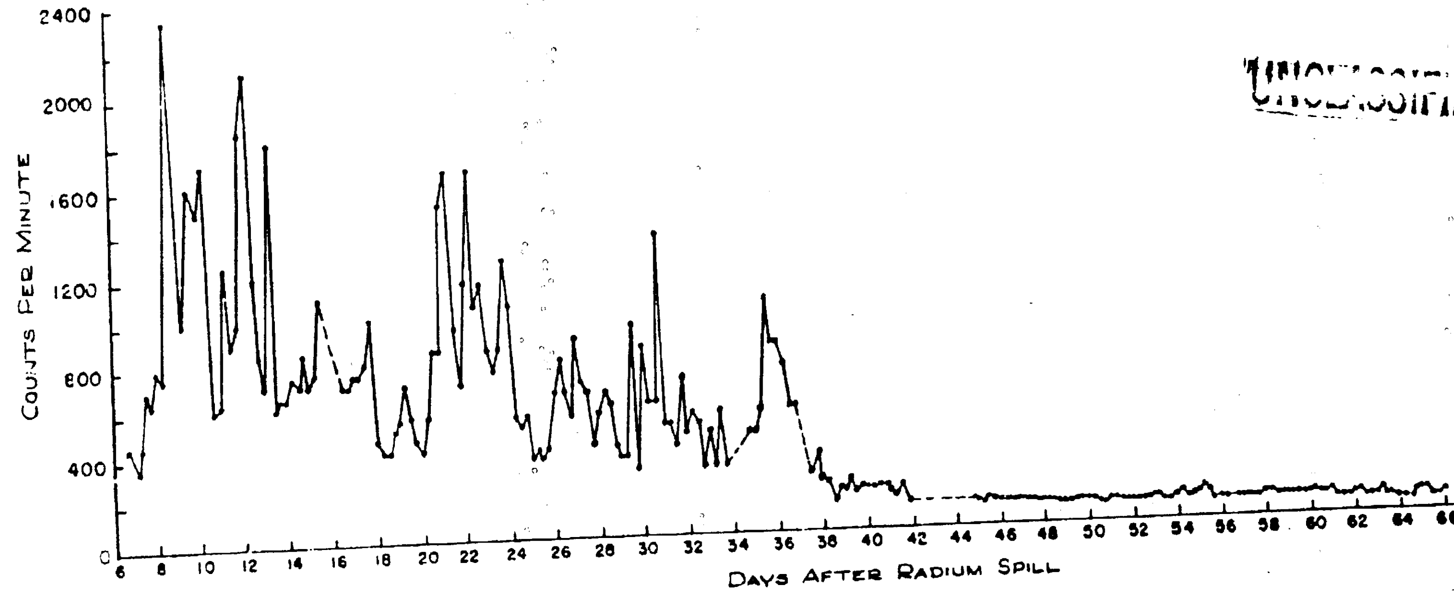

Spill Occurred 17 Jan. 1950

FIGURE 3

Continuous Monitoring of the Beta Activity of Radon Decay Products
(Collection Rate = 1.5 CFM)

[redacted]

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
1	TI-01	2007-08	0.028	jar	0.0031	New World Technology 3/7/2007 to 4/27/2008
2	TI-02	2007-08	0.022	jar	0.0024	New World Technology 3/7/2007 to 4/27/2008
3	TI-03	2007-08	0.044	jar	0.0049	New World Technology 3/7/2007 to 4/27/2008
4	TI-04	2007-08	0.032	jar	0.0035	New World Technology 3/7/2007 to 4/27/2008
5	TI-05	2007-08	12	jar	1.3271	New World Technology 3/7/2007 to 4/27/2008
6	TI-06	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 4/27/2008
7	TI-07	2007-08	9	foil	0.9954	New World Technology 3/7/2007 to 4/27/2008
8	TI-08	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 4/27/2008
9	TI-09	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 4/27/2008
10	TI-10	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 4/27/2008
11	TI-11	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 4/27/2008
12	TI-12	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 4/27/2008
13	TI-13	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
14	TI-14	2007-08	5	foil	0.5530	New World Technology 3/7/2007 to 11/24/2008
15	TI-15	2007-08	9	foil	0.9954	New World Technology 3/7/2007 to 11/24/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
16	TI-16	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
17	TI-17	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 4/27/2008
18	TI-18	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
19	TI-19	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 11/24/2008
20	TI-20	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 11/24/2008
21	TI-21	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
22	TI-22	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
23	TI-23	2007-08	4	foil	0.4424	New World Technology 3/7/2007 to 11/24/2008
24	TI-24	2007-08	4	foil	0.4424	New World Technology 3/7/2007 to 4/27/2008
25	TI-25	2007-08	12	foil	1.3271	New World Technology 3/7/2007 to 11/24/2008
26	TI-26	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
27	TI-27	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
28	TI-28	2007-08	0.02	button	0.0022	New World Technology 3/7/2007 to 11/24/2008
29	TI-29	2007-08	0.006	foil	0.0007	New World Technology 3/7/2007 to 4/27/2008
30	TI-30	2007-08	0.02	foil	0.0022	New World Technology 3/7/2007 to 11/24/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
31	TI-31	2007-08	0.044	button	0.0049	New World Technology 3/7/2007 to 11/24/2008
32	TI-32	2007-08	0.04	button	0.0044	New World Technology 3/7/2007 to 11/24/2008
33	TI-33	2007-08	0.006	button	0.0007	New World Technology 3/7/2007 to 11/24/2008
34	TI-34	2007-08	0.022	button	0.0024	New World Technology 3/7/2007 to 11/24/2008
35	TI-35	2007-08	0.022	button	0.0024	New World Technology 3/7/2007 to 11/24/2008
36	TI-36	2007-08	0.02	button	0.0022	New World Technology 3/7/2007 to 4/27/2008
37	TI-37	2007-08	0.032	button	0.0035	New World Technology 3/7/2007 to 11/24/2008
38	TI-38	2007-08	0.03	button	0.0033	New World Technology 3/7/2007 to 11/24/2008
39	TI-39	2007-08	0.032	button	0.0035	New World Technology 3/7/2007 to 11/24/2008
40	TI-40	2007-08	0.02	clear button cover	0.0022	New World Technology 3/7/2007 to 11/24/2008
41	TI-41	2007-08	0.04	soil	0.0044	New World Technology 3/7/2007 to 4/27/2008
42	TI-43	2007-08	0.026	rusted metal	0.0029	New World Technology 3/7/2007 to 11/24/2008
43	TI-44	2007-08	0.015	metal strap with button	0.0017	New World Technology 3/7/2007 to 11/24/2008
44	TI-45	2007-08	0.03	soil	0.0033	New World Technology 3/7/2007 to 11/24/2008
45	TI-46	2007-08	0.024	piece of old deck marker?	0.0027	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
46	TI-47	2007-08	0.02	soil	0.0022	New World Technology 3/7/2007 to 11/24/2008
47	TI-48	2007-08	0.015	soil	0.0017	New World Technology 3/7/2007 to 11/24/2008
48	TI-49	2007-08	0.015	soil	0.0017	New World Technology 3/7/2007 to 4/27/2008
49	TI-50	2007-08	0.04	soil	0.0044	New World Technology 3/7/2007 to 11/24/2008
50	TI-51	2007-08	0.015	soil	0.0017	New World Technology 3/7/2007 to 11/24/2008
51	TI-52	2007-08	0.024	soil	0.0027	New World Technology 3/7/2007 to 11/24/2008
52	TI-53	2007-08	0.08	soil	0.0088	New World Technology 3/7/2007 to 11/24/2008
53	TI-54	2007-08	0.022	soil	0.0024	New World Technology 3/7/2007 to 4/27/2008
54	TI-55	2007-08	0.015	soil	0.0017	New World Technology 3/7/2007 to 11/24/2008
55	TI-56	2007-08	9	foil	0.9954	New World Technology 3/7/2007 to 11/24/2008
56	TI-57	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
57	TI-58	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
58	TI-59	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
59	TI-60	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
60	TI-61	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 4/27/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
61	TI-62	2007-08	8	two 0.5 cm chunks of corrosion?	0.8848	New World Technology 3/7/2007 to 11/24/2008
62	TI-63	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
63	TI-64	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 11/24/2008
64	TI-65	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
65	TI-66	2007-08	0.24	foil	0.0265	New World Technology 3/7/2007 to 4/27/2008
66	TI-67	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
67	TI-68	2007-08	6	foil	0.6636	New World Technology 3/7/2007 to 11/24/2008
68	TI-69	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
69	TI-70	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
70	TI-71	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 11/24/2008
71	TI-72	2007-08	12	foil	1.3271	New World Technology 3/7/2007 to 11/24/2008
72	TI-73	2007-08	8	foil	0.8848	New World Technology 3/7/2007 to 4/27/2008
73	TI-74	2007-08	1.6	foil	0.1770	New World Technology 3/7/2007 to 11/24/2008
74	100	2007-08	58	foil	6.4145	New World Technology 3/7/2007 to 11/24/2008
75	101	2007-08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
76	102	2007-08	5	foil	0.5530	New World Technology 3/7/2007 to 11/24/2008
77	103	2007-08	0.012	soil	0.0013	New World Technology 3/7/2007 to 4/27/2008
78	104	2007-08	0.008	soil	0.0009	New World Technology 3/7/2007 to 11/24/2008
79	105	2007-08	0.006	soil	0.0007	New World Technology 3/7/2007 to 11/24/2008
80	106	2007-08	0.03	button	0.0033	New World Technology 3/7/2007 to 11/24/2008
81	107	2007-08	0.022	button	0.0024	New World Technology 3/7/2007 to 11/24/2008
82	108	2007-08	0.015	button	0.0017	New World Technology 3/7/2007 to 11/24/2008
83	109	2007-08	0.034	button	0.0038	New World Technology 3/7/2007 to 11/24/2008
84	110	2007-08	0.024	button	0.0027	New World Technology 3/7/2007 to 4/27/2008
85	111	2007-08	0.012	soil	0.0013	New World Technology 3/7/2007 to 11/24/2008
86	112	2007-08	0.04	button	0.0044	New World Technology 3/7/2007 to 11/24/2008
87	113	2007-08	0.006	soil	0.0007	New World Technology 3/7/2007 to 11/24/2008
88	114	2007-08	0.23	button	0.0254	New World Technology 3/7/2007 to 11/24/2008
89	115	2007-08	0.02	button	0.0022	New World Technology 3/7/2007 to 4/27/2008
90	401	04/28/08	6	foil	0.6636	New World Technology 3/7/2007 to 11/24/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
91	402	04/29/08	5	foil	0.5530	New World Technology 3/7/2007 to 11/24/2008
92	403	04/29/08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
93	404	04/30/08	12	foil	1.3271	New World Technology 3/7/2007 to 11/24/2008
94	405	04/30/08	2	possible foil fragments	0.2212	New World Technology 3/7/2007 to 11/24/2008
95	501	05/01/08	15	foil	1.6589	New World Technology 3/7/2007 to 11/24/2008
96	502	05/21/08	0.04	button	0.0044	New World Technology 3/7/2007 to 4/27/2008
97	503	05/22/08	0.008	switch	0.0009	New World Technology 3/7/2007 to 11/24/2008
98	504	05/29/08	0.035	button	0.0039	New World Technology 3/7/2007 to 11/24/2008
99	601	06/02/08	0.025	button	0.0028	New World Technology 3/7/2007 to 11/24/2008
100	602	06/16/08	2	appear to be foil fragments	0.2212	New World Technology 3/7/2007 to 11/24/2008
101	603	06/19/08	0.04	button	0.0044	New World Technology 3/7/2007 to 4/27/2008
102	604	06/26/08	0.04	foil	0.0044	New World Technology 3/7/2007 to 11/24/2008
103	701	07/03/08	0.04	button	0.0044	New World Technology 3/7/2007 to 11/24/2008
104	702	07/24/08	0.008	electronic component	0.0009	New World Technology 3/7/2007 to 11/24/2008
105	703	07/24/08	0.008	metallic piece	0.0009	New World Technology 3/7/2007 to 11/24/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
106	704	07/24/08	0.025	button like	0.0028	New World Technology 3/7/2007 to 11/24/2008
107	705	07/24/08	0.02	metallic piece	0.0022	New World Technology 3/7/2007 to 11/24/2008
108	706	07/30/08	0.008	switch	0.0009	New World Technology 3/7/2007 to 4/27/2008
109	707	07/30/08	0.008	metal piece	0.0009	New World Technology 3/7/2007 to 11/24/2008
110	801	08/04/08	0.008	metal piece	0.0009	New World Technology 3/7/2007 to 11/24/2008
111	802	08/12/08	10	foil	1.1060	New World Technology 3/7/2007 to 11/24/2008
112	803	08/19/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
113	804	08/19/08	10	foil fragments	1.1060	New World Technology 3/7/2007 to 4/27/2008
114	805	08/20/08	0.4	metal fragments	0.0442	New World Technology 3/7/2007 to 11/24/2008
115	806	08/20/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
116	807	08/26/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
117	808	08/27/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
118	809	08/28/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
119	810	08/28/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
120	901	09/02/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 4/27/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
121	902	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
122	903	09/23/08	0.01	switch	0.0011	New World Technology 3/7/2007 to 11/24/2008
123	904	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
124	905	09/23/08	0.04	metal fragments	0.0044	New World Technology 3/7/2007 to 11/24/2008
125	906	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
126	907	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
127	908	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
128	909	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
129	910	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
130	911	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
131	912	09/23/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
132	913	09/23/08	4	foil	0.4424	New World Technology 3/7/2007 to 4/27/2008
133	914	09/24/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
134	915	09/24/08	0.014	metal fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
135	916	09/24/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
136	917	09/24/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
137	918	09/24/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
138	919	09/24/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
139	920	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
140	921	09/25/08	0.04	metal fragments	0.0044	New World Technology 3/7/2007 to 11/24/2008
141	922	09/25/08	0.014	metal fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
142	923	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
143	924	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
144	925	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
145	926	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
146	927	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
147	928	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
148	929	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
149	930	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
150	931	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
151	932	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
152	933	09/25/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
153	934	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
154	935	09/25/08	0.018	metal fragments	0.0020	New World Technology 3/7/2007 to 11/24/2008
155	936	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
156	937	09/25/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
157	938	09/25/08	0.03	metal fragments	0.0033	New World Technology 3/7/2007 to 11/24/2008
158	939	09/29/08	20	foil	2.2119	New World Technology 3/7/2007 to 11/24/2008
159	940	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
160	941	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
161	942	09/29/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 4/27/2008
162	943	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
163	944	09/29/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
164	945	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
165	946	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
166	947	09/29/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
167	948	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
168	949	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
169	950	09/29/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
170	951	09/29/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
171	952	09/30/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
172	953	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
173	954	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
174	955	09/30/08	0.22	metal fragments	0.0243	New World Technology 3/7/2007 to 11/24/2008
175	956	09/30/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
176	957	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
177	958	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
178	959	09/30/08	0.014	metal fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
179	960	09/30/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
180	961	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 4/27/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
181	962	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
182	963	09/30/08	0.014	metal fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
183	964	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
184	965	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
185	966	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 4/27/2008
186	967	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
187	968	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
188	969	09/30/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
189	970	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
190	971	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
191	972	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
192	973	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 4/27/2008
193	974	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
194	975	09/30/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
195	976	09/30/08	0.018	metal fragments	0.0020	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
196	977	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
197	978	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 4/27/2008
198	979	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
199	980	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
200	981	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
201	982	09/30/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
202	983	09/30/08	0.014	metal fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
203	984	09/30/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
204	1001	10/01/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
205	1002	10/01/08	0.08	metal fragments	0.0088	New World Technology 3/7/2007 to 11/24/2008
206	1003	10/01/08	0.03	metal fragments	0.0033	New World Technology 3/7/2007 to 11/24/2008
207	1004	10/01/08	0.05	metal fragments	0.0055	New World Technology 3/7/2007 to 11/24/2008
208	1005	10/01/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
209	1006	10/01/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
210	1007	10/01/08	0.05	metal fragments	0.0055	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
211	1008	10/01/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
212	1009	10/01/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
213	1010	10/01/08	0.08	metal fragments	0.0088	New World Technology 3/7/2007 to 11/24/2008
214	1011	10/01/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
215	1012	10/01/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
216	1013	10/01/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
217	1014	10/02/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
218	1015	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
219	1016	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
220	1017	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
221	1018	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
222	1019	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
223	1020	10/02/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
224	1021	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
225	1022	10/02/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
226	1023	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
227	1024	10/02/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
228	1025	10/02/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
229	1026	10/06/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
230	1027	10/06/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
231	1028	10/06/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
232	1029	10/06/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
233	1030	10/07/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
234	1031	10/07/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
235	1032	10/07/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
236	1033	10/07/08	2	foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
237	1034	10/07/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
238	1035	10/07/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
239	1036	10/08/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
240	1037	10/08/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
241	1038	10/08/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
242	1039	10/08/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
243	1040	10/08/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
244	1041	10/09/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
245	1042	10/09/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
246	1043	10/13/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
247	1044	10/13/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
248	1045	10/13/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
249	1046	10/13/08	0.025	metal fragments	0.0028	New World Technology 3/7/2007 to 11/24/2008
250	1047	10/13/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
251	1048	10/13/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
252	1049	10/13/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
253	1050	10/13/08	0.04	metal fragments	0.0044	New World Technology 3/7/2007 to 11/24/2008
254	1051	10/13/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
255	1052	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
256	1053	10/14/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
257	1054	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
258	1055	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
259	1056	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
260	1057	10/14/08	0.015	4" dia x 4" long cylindrical gauge	0.0017	New World Technology 3/7/2007 to 11/24/2008
261	1058	10/14/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
262	1059	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
263	1060	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
264	1061	10/14/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
265	1062	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
266	1063	10/14/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
267	1064	10/15/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
268	1065	10/15/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
269	1066	10/15/08	1.5	foil	0.1659	New World Technology 3/7/2007 to 11/24/2008
270	1067	10/15/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
271	1068	10/15/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
272	1069	10/15/08	0.5	metal fragments	0.0553	New World Technology 3/7/2007 to 11/24/2008
273	1070	10/15/08	0.02	foil fragment	0.0022	New World Technology 3/7/2007 to 11/24/2008
274	1071	10/16/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
275	1072	10/16/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
276	1073	10/16/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
277	1074	10/16/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
278	1075	10/16/08	0.004	metal fragments	0.0004	New World Technology 3/7/2007 to 11/24/2008
279	1076	10/16/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
280	1077	10/16/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
281	1078	10/16/08	0.1	metal disc	0.0111	New World Technology 3/7/2007 to 11/24/2008
282	1079	10/20/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
283	1080	10/20/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
284	1081	10/20/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
285	1082	10/20/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
286	1083	10/20/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
287	1084	10/20/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
288	1085	10/20/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
289	1086	10/20/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
290	1087	10/21/08	0.007	metal fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
291	1088	10/21/08	0.012	metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
292	1089	10/21/08	0.007	metal fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
293	1090	10/21/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
294	1091	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
295	1092	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
296	1093	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
297	1094	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
298	1095	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
299	1096	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
300	1097	10/23/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
301	1098	10/27/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
302	1099	10/27/08	0.007	metal fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
303	10100	10/27/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
304	10101	10/27/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
305	10102	10/27/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
306	10103	10/27/08	0.007	metal fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
307	10104	10/27/08	0.015	metal fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
308	10105	10/27/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
309	10106	10/28/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
310	10107	10/28/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
311	10108	10/28/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
312	10109	10/28/08	0.004	metal fragments	0.0004	New World Technology 3/7/2007 to 11/24/2008
313	10110	10/28/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
314	10111	10/28/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
315	10112	10/28/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
316	10113	10/28/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
317	10114	10/28/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
318	10115	10/28/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
319	10116	10/28/08	0.005	metal fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
320	10117	10/28/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
321	10118	10/28/08	0.007	metal fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
322	10119	10/28/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
323	10120	10/29/08	2.8	Soil/Debris Fragments	0.3097	New World Technology 3/7/2007 to 11/24/2008
324	10121	10/29/08	0.014	Metal Fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
325	10122	10/29/08	0.014	Metal Fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
326	10123	10/29/08	0.03	Metal Fragments	0.0033	New World Technology 3/7/2007 to 11/24/2008
327	10124	10/29/08	2	Foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
328	10125	10/29/08	0.05	Button	0.0055	New World Technology 3/7/2007 to 11/24/2008
329	10126	10/29/08	2	Foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
330	10127	10/30/08	0.07	Metal Fragments	0.0077	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
331	10128	10/30/08	1.5	Foil	0.1659	New World Technology 3/7/2007 to 11/24/2008
332	10128	10/30/08	0.012	Metal Fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
333	10130	10/30/08	1	Foil Fragments	0.1106	New World Technology 3/7/2007 to 11/24/2008
334	10131	10/30/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
335	10132	10/30/08	0.05	Soil	0.0055	New World Technology 3/7/2007 to 11/24/2008
336	10133	10/30/08	0.04	Soil	0.0044	New World Technology 3/7/2007 to 11/24/2008
337	10134	10/30/08	0.035	Metal Fragments	0.0039	New World Technology 3/7/2007 to 11/24/2008
338	10135	10/30/08	0.012	Metal Fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
339	1101	11/04/08	2	Foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
340	1102	11/04/08	0.017	Metal Fragments	0.0019	New World Technology 3/7/2007 to 11/24/2008
341	1103	11/04/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
342	1104	11/04/08	0.012	Metal Fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
343	1105	11/04/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
344	1106	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
345	1107	11/04/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
346	1108	11/04/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
347	1109	11/04/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
348	1110	11/04/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
349	1111	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
350	1112	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
351	1113	11/04/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
352	1114	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
353	1115	11/04/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
354	1116	11/04/08	0.04	Metal Fragments	0.0044	New World Technology 3/7/2007 to 11/24/2008
355	1117	11/04/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
356	1118	11/04/08	0.03	Metal Fragments	0.0033	New World Technology 3/7/2007 to 11/24/2008
357	1119	11/04/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
358	1120	11/04/08	4	Foil	0.4424	New World Technology 3/7/2007 to 11/24/2008
359	1121	11/04/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
360	1122	11/04/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008

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361	1123	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
362	1124	11/04/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
363	1125	11/04/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
364	1126	11/05/08	1.5	Foil	0.1659	New World Technology 3/7/2007 to 11/24/2008
365	1127	11/05/08	0.05	Metal Fragments	0.0055	New World Technology 3/7/2007 to 11/24/2008
366	1128	11/05/08	1.5	Foil	0.1659	New World Technology 3/7/2007 to 11/24/2008
367	1129	11/05/08	0.012	Metal Fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
368	1130	11/05/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
369	1131	11/05/08	0.015	Metal Fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
370	1132	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
371	1133	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
372	1134	11/06/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
373	1135	11/06/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
374	1136	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
375	1137	11/06/08	0.5	Foil Fragment	0.0553	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
376	1138	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
377	1139	11/06/08	0.014	Metal Fragments	0.0015	New World Technology 3/7/2007 to 11/24/2008
378	1140	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
379	1141	11/06/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
380	1142	11/06/08	0.02	Button	0.0022	New World Technology 3/7/2007 to 11/24/2008
381	1143	11/06/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
382	1144	11/06/08	0.007	Metal Fragments	0.0008	New World Technology 3/7/2007 to 11/24/2008
383	1145	11/06/08	0.005	Metal Fragments	0.0006	New World Technology 3/7/2007 to 11/24/2008
384	1146	11/10/08	2	Foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
385	1147	11/10/08	1.5	Foil	0.1659	New World Technology 3/7/2007 to 11/24/2008
386	1148	11/10/08	0.025	Metal Fragments	0.0028	New World Technology 3/7/2007 to 11/24/2008
387	1149	11/10/08	0.008	Soil	0.0009	New World Technology 3/7/2007 to 11/24/2008
388	1150	11/10/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
389	1151	11/10/08	0.008	Soil	0.0009	New World Technology 3/7/2007 to 11/24/2008
390	1152	11/10/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
391	1153	11/10/08	0.025	Metal Fragments	0.0028	New World Technology 3/7/2007 to 11/24/2008
392	1154	11/10/08	2	Foil Fragments / Soil	0.2212	New World Technology 3/7/2007 to 11/24/2008
393	1155	11/10/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
394	1156	11/10/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
395	1157	11/10/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
396	1158	11/10/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
397	1159	11/10/08	2	Foil	0.2212	New World Technology 3/7/2007 to 11/24/2008
398	1160	11/10/08	0.006	Metal Fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
399	1161	11/10/08	0.015	Metal Fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
400	1162	11/11/08	0.008	Metal Fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
401	1163	11/12/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
402	1164	11/13/08	0.02	Metal Fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
403	1165	11/17/08	0.005	metal object 4" dia x 6"	0.0006	New World Technology 3/7/2007 to 11/24/2008
404	1166	11/17/08	0.012	soil with metal fragments	0.0013	New World Technology 3/7/2007 to 11/24/2008
405	1167	11/17/08	0.007	small metal fragment	0.0008	New World Technology 3/7/2007 to 11/24/2008

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
406	1168	11/17/08	0.01	small metal object	0.0011	New World Technology 3/7/2007 to 11/24/2008
407	1169	11/17/08	0.004	metal fragment	0.0004	New World Technology 3/7/2007 to 11/24/2008
408	1170	11/17/08	0.005	metal object 1 ft x 1" dia	0.0006	New World Technology 3/7/2007 to 11/24/2008
409	1171	11/17/08	0.01	metal fragment	0.0011	New World Technology 3/7/2007 to 11/24/2008
410	1172	11/17/08	0.012	metal fragment	0.0013	New World Technology 3/7/2007 to 11/24/2008
411	1173	11/17/08	0.008	rusted metal object 9" dia	0.0009	New World Technology 3/7/2007 to 11/24/2008
412	1174	11/17/08	0.01	metal fragment	0.0011	New World Technology 3/7/2007 to 11/24/2008
413	1175	11/17/08	0.005	metal fragment	0.0006	New World Technology 3/7/2007 to 11/24/2008
414	1176	11/17/08	0.012	metal fragment	0.0013	New World Technology 3/7/2007 to 11/24/2008
415	1177	11/17/08	0.015	soil with metal fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
416	1178	11/18/08	0.015	metal fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
417	1179	11/18/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
418	1180	11/18/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
419	1181	11/18/08	0.025	foil	0.0028	New World Technology 3/7/2007 to 11/24/2008
420	1182	11/18/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
421	1183	11/18/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
422	1184	11/18/08	0.03	button	0.0033	New World Technology 3/7/2007 to 11/24/2008
423	1185	11/18/08	0.025	metal fragments	0.0028	New World Technology 3/7/2007 to 11/24/2008
424	1186	11/18/08	0.03	button	0.0033	New World Technology 3/7/2007 to 11/24/2008
425	1187	11/18/08	0.008	metal fragments	0.0009	New World Technology 3/7/2007 to 11/24/2008
426	1188	11/18/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
427	1189	11/18/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
428	1190	11/18/08	0.025	button	0.0028	New World Technology 3/7/2007 to 11/24/2008
429	1191	11/18/08	0.006	metal fragments	0.0007	New World Technology 3/7/2007 to 11/24/2008
430	1192	11/18/08	0.015	metal fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
431	1193	11/18/08	0.015	metal fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
432	1194	11/18/08	0.01	brick (concrete)	0.0011	New World Technology 3/7/2007 to 11/24/2008
433	1195	11/18/08	0.02	metal fragments	0.0022	New World Technology 3/7/2007 to 11/24/2008
434	1196	11/18/08	0.01	metal fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
435	1197	11/20/08	1.5	Foil	0.1659	New World Technology 3/7/2007 to 11/24/2008

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
436	1198	11/20/08	0.025	Glass	0.0028	New World Technology 3/7/2007 to 11/24/2008
437	1199	11/24/08	0.01	Metal Fragments	0.0011	New World Technology 3/7/2007 to 11/24/2008
438	11100	11/24/08	0.015	Soil/Metal Fragments	0.0017	New World Technology 3/7/2007 to 11/24/2008
439	09-0001	01/15/09	0.01	Metal Fragments	0.0011	Shaw 07/02/09 to Present
440	070209-1	07/02/09	0.02	Metal Fragment	0.0022	
441	070209-2	07/02/09	0.013	Sandy soil (1 tsp)	0.0014	Shaw 07/02/09 to Present
442	070609-3	07/06/09	0.01	Metal flakes & soil	0.0011	Shaw 07/02/09 to Present
443	070709-4	07/07/09	0.032	4-in dia by 8-in long rusted metal cylinder	0.0035	Shaw 07/02/09 to Present
444	070709-5	07/07/09	0.013	3-in by 2-in flat rusty metal	0.0014	Shaw 07/02/09 to Present
445	070709-6	07/07/09	0.009	1.5-in round by 3/8-in thick metallic device	0.0010	Shaw 07/02/09 to Present
446	070709-7	07/07/09	0.02	metal fragment 0.75-in by 0.5-in by 0.125-in	0.0022	Shaw 07/02/09 to Present
447	070809-8	07/08/09	0.015	3 metal fragments mixed w/soil	0.0017	Shaw 07/02/09 to Present
448	070809-9	07/08/09	0.016	Soil and Rust flakes ~ 2 tsp	0.0018	Shaw 07/02/09 to Present
449	070909-10	07/09/09	0.011	Soil ~ 2 tbsp	0.0012	Shaw 07/02/09 to Present
450	071409-11	07/14/09	0.013	3.5-in round metal	0.0014	Shaw 07/02/09 to Present
451	071409-12	07/14/09	0.014	~1 cup soil	0.0015	Shaw 07/02/09 to Present

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
452	071409-13	07/14/09	0.013	~1/4 cup soil w/metal flakes	0.0014	Shaw 07/02/09 to Present
453	071409-14	07/14/09	0.022	Metal 3/4-in long by 1/2-in thick by 1/2-in wide	0.0024	Shaw 07/02/09 to Present
454	071409-15	07/14/09	0.018	Oval metal fragment 1/2-in long by 3/8-in wide	0.0020	Shaw 07/02/09 to Present
455	071409-16	07/14/09	0.014	1/8 cup of soil	0.0015	Shaw 07/02/09 to Present
456	071409-17	07/14/09	0.016	Metal fragment 3/4-in long by 1/4-in wide	0.0018	Shaw 07/02/09 to Present
457	071409-18	07/14/09	0.016	1.5 cups soil with metal fragments	0.0018	Shaw 07/02/09 to Present
458	071509-19	07/15/09	0.015	Wire 3-in long by 1/4-in diameter	0.0017	Shaw 07/02/09 to Present
459	071509-20	07/15/09	0.016	Gauge 5-in diameter by 5-in long with wires extending from the back	0.0018	Shaw 07/02/09 to Present
460	072009-21	07/20/09	0.016	wire 2.5-in long by 0.25-in in diameter	0.0018	Shaw 07/02/09 to Present
461	072009-22	07/20/09	0.015	2-in rounded piece of metal 1/4–in wide	0.0017	Shaw 07/02/09 to Present
462	072009-23	07/20/09	0.012	1.5-in diameter, 3/8-in thick piece of metal	0.0013	Shaw 07/02/09 to Present

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
463	072009-24	07/20/09	0.012	A gauge 4-in in diameter by 3-in deep	0.0013	Shaw 07/02/09 to Present
464	072109-25	07/21/09	0.014	piece of metal 1.75-in long by 3/4-in wide	0.0015	Shaw 07/02/09 to Present
465	072109-26	07/21/09	0.024	3/4-in diameter by 1/2-in thick button	0.0027	Shaw 07/02/09 to Present
466	072109-27	07/21/09	0.013	3-in diameter by 3-in deep gauge	0.0014	Shaw 07/02/09 to Present
467	072109-28	07/21/09	0.034	piece of metal 5-in long by 3.5-in wide by 3-in deep	0.0038	Shaw 07/02/09 to Present
468	072209-29	07/22/09	0.017	4-in round by 1.5-in deep metal object	0.0019	Shaw 07/02/09 to Present
469	080309-30	08/03/09	0.016	3.5" x 2.5" x 1.5" Metal object fused with rock	0.0018	Shaw 07/02/09 to Present
470	080309-31	08/03/09	0.012	5" x 4" x 1" Metal Object	0.0013	Shaw 07/02/09 to Present
471	080309-32	08/03/09	0.012	.75" x .5" x .25" Metal Object	0.0013	Shaw 07/02/09 to Present
472	080309-33	08/03/09	0.012	3" x 1.5" x 1" Metal object	0.0013	Shaw 07/02/09 to Present
473	080309-34	08/03/09	0.013	1.5" x 1" x .5" Metal	0.0014	Shaw 07/02/09 to Present
474	080509-35	08/05/09	0.012	Fused mixture of glass, rock, and soil 6" x 4" x 2"	0.0013	Shaw 07/02/09 to Present

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No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
475	081109-36	08/11/09	0.014	Fused metal rock and glass 6" round x 3" thick	0.0015	Shaw 07/02/09 to Present
476	081109-37	08/11/09	0.019	Infused rock, metal and glass 9" long x 6" wide x 5" thick	0.0021	Shaw 07/02/09 to Present
477	081209-38	08/12/09	0.019	4 Metal fragments .75" x .25" and up to 4" x 2" x 1.5"	0.0021	Shaw 07/02/09 to Present
478	081809-39	08/18/09	1	Hexagon shaped object ~.75"	0.1106	Shaw 07/02/09 to Present
479	081809-39A	08/18/09	0.014	7" x 3.5" x 2" object	0.0015	Shaw 07/02/09 to Present
480	082009-40	08/20/09	0.036	Round metal object 1.5" round and .5" thick	0.0040	Shaw 07/02/09 to Present
481	082409-41	08/24/09	0.015	Round metal object 1.5" x 1" x .5"	0.0017	Shaw 07/02/09 to Present
482	082409-42	08/24/09	0.04	Round metal object .75" round and .5" thick	0.0044	Shaw 07/02/09 to Present
483	083109-43	08/31/09	0.017	2" x .5" pocket watch	0.0019	Shaw 07/02/09 to Present
484	083109-44	08/31/09	2	Dime size piece of black metal hexagon shaped	0.2212	Shaw 07/02/09 to Present
485	083109-45	08/31/09	0.024	An infused rock metal and wire 1.5" x 1.25" x .5"	0.0027	Shaw 07/02/09 to Present
486	083109-46	08/31/09	0.06	Round metal object 2" x .5" round	0.0066	Shaw 07/02/09 to Present

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487	090209-47	09/02/09	0.036	Metal button 1.5" x .25"	0.0040	Shaw 07/02/09 to Present
488	090209-48	09/02/09	0.032	Metal object 3" long x 2" wide x 1.5" thick	0.0035	Shaw 07/02/09 to Present
489	091509-49	09/15/09	0.018	Metal object 3" x 2" x 1.5"	0.0020	Shaw 07/02/09 to Present
490	092309-50	09/23/09	0.016	Metal object 1/2" across and 1/8" in depth	0.0018	Shaw 07/02/09 to Present
491	092909-51	09/29/09	0.018	Metal object 3/4" round and 3/8" deep	0.0020	Shaw 07/02/09 to Present
492	093009-52	09/30/09	1.4	Metal object 1/2" diameter and 1/8" deep	0.1548	Shaw 07/02/09 to Present
493	093009-53	09/30/09	0.014	Metal object 1/2" x 1/4" round	0.0015	Shaw 07/02/09 to Present
494	093009-54	09/30/09	0.022	Metal object 4" x 2.5" x 1"	0.0024	Shaw 07/02/09 to Present
495	100109-55	10/01/09	0.044	10" long tool (micrometer)	0.0049	Shaw 07/02/09 to Present
496	102209-56	10/22/09	0.014	Metal object 1" x 1/2" x 1/8"	0.0015	Shaw 07/02/09 to Present
497	102209-57	10/22/09	0.03	Metal object 3 1/2" x 1/2"	0.0033	Shaw 07/02/09 to Present
498	102609-58	10/26/09	0.024	Round metal object 3/4" by 1/4"	0.0027	Shaw 07/02/09 to Present
499	102609-59	10/26/09	0.017	Triangular metal object 1/2" x 1/4"	0.0019	Shaw 07/02/09 to Present
500	102609-60	10/26/09	0.014	Metal object 1/2" x 1/2" x 1/8"	0.0015	Shaw 07/02/09 to Present
501	110409-61	11/04/09	0.014	Wrist watch (no band) 3/4" x 1/4"	0.0015	Shaw 07/02/09 to Present

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502	110409-62	11/04/09	0.02	Metal object 2 1/2" x 1"	0.0022	Shaw 07/02/09 to Present
503	110409-63	11/04/09	0.024	Metal object 3/8" x 3/8" x 1/8"	0.0027	Shaw 07/02/09 to Present
504	110409-64	11/04/09	0.016	Metal object 4" x 1 1/2"	0.0018	Shaw 07/02/09 to Present
505	110909-65	11/09/09	0.013	Fused wire and rock 2" x 3/4" x 1/2"	0.0014	Shaw 07/02/09 to Present
506	111009-66	11/10/09	0.013	Metal object 1/2" x 1/2" x 1/4"	0.0014	Shaw 07/02/09 to Present
507	111009-67	11/10/09	0.015	Wire 3" long by 1 1/4"	0.0017	Shaw 07/02/09 to Present
508	111209-68	11/12/09	0.034	Metal object 3/4" x 1/2" x 1/4"	0.0038	Shaw 07/02/09 to Present
509	111709-69	11/17/09	0.015	Metal object 1 3/4" x 1/2"	0.0017	Shaw 07/02/09 to Present
510	112309-70	11/23/09	0.015	Fused metal and wire 4" x 2"	0.0017	Shaw 07/02/09 to Present
511	113009-71	11/30/09	0.013	Metal object 2" x 1" x 1"	0.0014	Shaw 07/02/09 to Present
512	113009-72	11/30/09	0.013	Compass 3/4" x 1/4"	0.0014	Shaw 07/02/09 to Present
513	120909-73	12/09/09	0.02	Metal object 3/4" x 1/2" x 1/2"	0.0022	Shaw 07/02/09 to Present
514	120909-74	12/09/09	0.02	Wire 3/4" x 1/4"	0.0022	Shaw 07/02/09 to Present
515	011310-75	01/13/10	0.036	Metal object 6" x 4"	0.0040	Shaw 07/02/09 to Present
516	011310-76	01/13/10	0.032	Metal object 2" x 1/2"	0.0035	Shaw 07/02/09 to Present
517	020210-77	02/02/10	0.034	Metal object 1 1/2" x 1/4"	0.0038	Shaw 07/02/09 to Present
518	020910-78	02/09/10	0.016	Metal object 1" x 1/2"	0.0018	Shaw 07/02/09 to Present
519	021010-79	02/10/10	0.015	Metal object 3" x 2 1/2" x 1/2"	0.0017	Shaw 07/02/09 to Present

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520	021010-80	02/10/10	0.018	Metal object 1" x 3/4" x 1/2"	0.0020	Shaw 07/02/09 to Present
521	021010-81	02/10/10	0.018	Metal object 1" x 3/4" x 1/2"	0.0020	Shaw 07/02/09 to Present
522	021110-82	02/11/10	0.022	Metal object 1" x 1/2"	0.0024	Shaw 07/02/09 to Present
523	021110-83	02/11/10	0.07	Metal object 2" x 1/2"	0.0077	Shaw 07/02/09 to Present
524	021510-84	02/15/10	0.06	Metal object (possible Radioluminescent Personnel Marker) 2" x 1/4"	0.0066	Shaw 07/02/09 to Present
525	021510-85	02/15/10	0.013	Metal object (slag) 4' x 3" x 3"	0.0014	Shaw 07/02/09 to Present
526	021510-86	02/15/10	0.018	Metal object 3/4" x 1/4"	0.0020	Shaw 07/02/09 to Present
527	021810-87	02/18/10	0.019	Metal object 1/4" round	0.0021	Shaw 07/02/09 to Present
528	021810-88	02/18/10	0.014	Metal object 1/2" x 1/4" x 1/4"	0.0015	Shaw 07/02/09 to Present
529	021810-89	02/18/10	0.015	Metal object 1/2" x 1/4" x 1/4"	0.0017	Shaw 07/02/09 to Present
530	021810-90	02/18/10	0.02	Metal object 1/8" round	0.0022	Shaw 07/02/09 to Present
531	022210-91	02/22/10	0.012	Metal object 1" x 3/4" x 1/2"	0.0013	Shaw 07/02/09 to Present
532	022210-92	02/22/10	0.02	Metal object 8" x 6" x 5"	0.0022	Shaw 07/02/09 to Present
533	022210-93	02/22/10	0.017	Metal object 1/2" x 1/4" x 1/4"	0.0019	Shaw 07/02/09 to Present
534	022210-94	02/22/10	0.016	Metal object 1/2" x 1/2" x 1/4"	0.0018	Shaw 07/02/09 to Present
535	022310-95	02/23/10	0.013	Metal object 1/2" x 1/4"	0.0014	Shaw 07/02/09 to Present

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536	030410-96	03/04/10	0.015	Metal object 1/2" round with 2" wire	0.0017	Shaw 07/02/09 to Present
537	030910-97	03/09/10	0.017	Metal object 1 1/2" x 1" x 1/4"	0.0019	Shaw 07/02/09 to Present
538	030910-98	03/09/10	0.034	Metal object 2" x 2" x 1/16"	0.0038	Shaw 07/02/09 to Present
539	030910-99	03/09/10	0.016	Metal object 1/2" x 1/4" x 1/8"	0.0018	Shaw 07/02/09 to Present
540	031010-100	03/10/10	0.06	Flat metal object 1/2" round	0.0066	Shaw 07/02/09 to Present
541	031010-101	03/10/10	0.018	Metal object 1" x 1/4" x 1/4"	0.0020	Shaw 07/02/09 to Present
542	032410-102	03/24/10	0.013	Metal object 1/4" x 1/4"	0.0014	Shaw 07/02/09 to Present
543	040710-103	04/07/10	0.03	Metal object 1/2" x 1/4"	0.0033	Shaw 07/02/09 to Present
544	050810-104	05/08/10	0.018	Metal object rusted oblong 1/8 " x 1/2"	0.0020	Shaw 07/02/09 to Present
545	051910-105	05/19/10	0.02	Metal object round 1/4" think by 1/2" diameter	0.0022	Shaw 07/02/09 to Present
546	052010-106	05/20/10	0.02	Metal object 4"x4" by 1/4" thick with a 2"x1.5 " diameter object attached in center	0.0022	Shaw 07/02/09 to Present
547	052010-107	05/20/10	0.015	Metal object cylindrical 1"x3/8" diameter	0.0017	Shaw 07/02/09 to Present
548	052010-108	05/20/10	0.8	Metal object 1/4"x1/2"	0.0885	Shaw 07/02/09 to Present

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549	052010-109	05/20/10	0.034	Metal object flat round 1/8" diameter x 1/2"	0.0038	Shaw 07/02/09 to Present
550	052610-110	05/26/10	0.015	Metal object oblong 1/2" x 1/4" x 1/4" thick	0.0017	Shaw 07/02/09 to Present
551	052610-111	05/26/10	0.02	Metal object oblong 1" x 1/2" x 1/4" thick	0.0022	Shaw 07/02/09 to Present
552	052610-112	05/26/10	0.013	Metal object square 1" x 1" x 1/2" thick	0.0014	Shaw 07/02/09 to Present
553	052610-113	05/26/10	0.013	Metal object round 1/2" diameter 1/8" thick	0.0014	Shaw 07/02/09 to Present
554	052610-114	05/26/10	0.015	Metal object oblong 1/2" x 1/4" x 1/8" thick	0.0017	Shaw 07/02/09 to Present
555	070110-115	07/01/10	0.013	Watch round 3" x 1/2"	0.0014	Shaw 07/02/09 to Present
556	070610-116	07/06/10	0.012	Metal object 1" x 1/4"	0.0013	Shaw 07/02/09 to Present
557	070610-117	07/06/10	0.013	Metal object 1" x 1/8"	0.0014	Shaw 07/02/09 to Present
558	070810-118	7/8/2010	0.015	Metal object 1/8" by 1/2" by 1/2"	0.0017	Shaw 07/02/09 to Present
559	070810-119	07/08/10	0.02	Metal round object 1/4" x 1/2" thick	0.0022	Shaw 07/02/09 to Present
560	071310-120	07/13/10	0.016	3" Needle from gauge	0.0018	Shaw 07/02/09 to Present
561	071310-121	07/13/10	0.015	1" long wire in insulation	0.0017	Shaw 07/02/09 to Present
562	071410-122	07/14/10	0.034	Personnel marker 1 1/2" diameter	0.0038	Shaw 07/02/09 to Present

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
563	071510-123	07/15/10	0.014	Metal Object 1" x 1/2"	0.0015	Shaw 07/02/09 to Present
564	071910-124	07/19/10	0.013	Piece of Metal 1/8" x 1/4"	0.0014	Shaw 07/02/09 to Present
565	072010-125	07/20/10	0.014	Metal fragment 1/2" x 1/2"	0.0015	Shaw 07/02/09 to Present
566	072110-126	07/21/10	0.014	Metal Foil 1" x 3"	0.0015	Shaw 07/02/09 to Present
567	072210-127	07/22/10	0.02	1" diameter round metal object 1/4" thick	0.0022	Shaw 07/02/09 to Present
568	072610-128	07/26/10	0.017	Metal 1/2" x 3"	0.0019	Shaw 07/02/09 to Present
569	072710-129	07/27/10	0.016	Stone & Metal 1/2" x 1/2"	0.0018	Shaw 07/02/09 to Present
570	072710-130	07/27/10	0.014	Metal object 1/4" x 1/8"	0.0015	Shaw 07/02/09 to Present
571	072710-131	07/27/10	0.017	Metal object 1/2" x 1/4"	0.0019	Shaw 07/02/09 to Present
572	072710-132	07/27/10	0.015	Metallic Fragment 1/32" x 1/64"	0.0017	Shaw 07/02/09 to Present
573	072710-133	07/27/10	0.014	1" x 1/2 thick triangle hard clay metallic	0.0015	Shaw 07/02/09 to Present
574	072710-134	07/27/10	0.024	1/2" x 3/4" triangular hard clay metallic	0.0027	Shaw 07/02/09 to Present
575	072710-135	07/27/10	0.026	Tiny metal fragment 1/8" x 1/8"	0.0029	Shaw 07/02/09 to Present
576	072710-136	07/27/10	0.016	1/4" x 1/8" x 1/8" oval metal object	0.0018	Shaw 07/02/09 to Present
577	072710-137	07/27/10	0.03	1" x 1" x 1/2" triangular hard clay metallic	0.0033	Shaw 07/02/09 to Present

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) [1]	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule [2]	LLRO Recovered By and Date Recovered
578	032013-138	03/20/13	1.6	flat octagonal metallic object	0.1770	Tetra Tech EC 03/20/13 to 06/03/13
579	032113-139	03/21/13	0.014	flat octagonal metallic object	0.0015	Tetra Tech EC 03/20/13 to 06/03/13
580	032013-140	05/30/13	0.014	soil	0.0015	Tetra Tech EC 03/20/13 to 06/03/13
581	032113-141	05/30/13	0.014	soil	0.0015	Tetra Tech EC 03/20/13 to 06/03/13
582	032013-142	05/30/13	0.024	soil	0.0027	Tetra Tech EC 03/20/13 to 06/03/13
583	032113-143	05/31/13	0.036	soil	0.0040	Tetra Tech EC 03/20/13 to 06/03/13
584	032013-144	05/31/13	0.015	soil	0.0017	Tetra Tech EC 03/20/13 to 06/03/13
585	032113-145	05/31/13	0.018	soil	0.0020	Tetra Tech EC 03/20/13 to 06/03/13
586	032013-146	06/03/13	0.04	foil fragment	0.0044	Tetra Tech EC 03/20/13 to 06/03/13
587	032113-147	03/21/13	0.022	UNK device	0.0024	Tetra Tech EC 03/20/13 to 06/03/13
588	012814-148	01/28/14	0.012	box of samples	0.0013	Tetra Tech EC 03/20/13 to 06/03/13
589	012814-149	01/28/14	0.4	box of samples	0.0442	Tetra Tech EC 03/20/13 to 06/03/13
590	012814-150	01/28/14	0.22	bucket of Samples	0.0243	Tetra Tech EC 03/20/13 to 06/03/13
591	012814-151	01/28/14	0.36	bag of soil from drum	0.0398	Tetra Tech EC 03/20/13 to 06/03/13
592	020514-152	02/05/14	1.2	metal object .75" hexagon	0.1327	CB&I 02/04/14 to 2/17/14
593	021114-153	02/11/14	0.018	Rock	0.0020	CB&I 02/04/14 to 2/17/14
594	021114-154	02/11/14	0.01	Metal fragment	0.0011	CB&I 02/04/14 to 2/17/14
595	021714-155	02/17/14	0.02	Gauge	0.0022	CB&I 02/04/14 to 2/17/14
596	021914-156	02/19/14	0.008	Toggle switch	0.0009	CB&I 02/19/14
597	022114-157	02/21/14	0.12	TtEC misc material	0.0133	CB&I 02/21/14

TABLE 1 – LOW-LEVEL RADIOLOGICAL OBJECTS RECOVERED FROM SITE 12
Historical Radiological Assessment Supplemental Technical Memorandum, NAVSTA TI, California

No.	LLRO ID Number	Date Recovered	Highest 30 cm (mR/h) 1	LLRO Description	Estimated Ra-226 (mCi) RadiumThumb Rule 2	LLRO Recovered By and Date Recovered
598	020214-158	02/20/14	0.008	metal objects	0.0009	CB&I 02/20/14
599	022414-159	02/24/14	0.01	metal debris	0.0011	CB&I 02/24/14
600	022414-160	02/24/14	0.16	knob/ Button	0.0177	CB&I 02/24/14
601	032514-161	03/25/14	0.11	2 " dial	0.0122	CB&I 03/25/14
602	Gilbane 1	10/29/13	0.028	debris < 3 cm diameter	0.0031	Gilbane 10/29/13
603	Gilbane 2	10/29/13	0.015	fragments in soil	0.0017	Gilbane 10/29/13
604	Gilbane 3	11/12/13	0.028	metal object	0.0031	Gilbane 11/12/13
605	Gilbane 4	12/02/13	0.02	metal object	0.0022	Gilbane 12/02/13
606	Gilbane 5	12/02/13	0.006	metal object	0.0007	Gilbane 12/02/13
607	Gilbane 6	12/02/13	0.03	metal object	0.0033	Gilbane 12/02/13
608	Gilbane 7	12/05/13	0.03	metal object	0.0033	Gilbane 12/05/13
609	Gilbane 8	12/09/13	0.025	metal object	0.0028	Gilbane 12/09/13
610	Gilbane 9	01/29/14	0.012	glass dial	0.0013	Gilbane 01/29/14

Note:

1. Reading shown as measured in mR/h or calculated using highest contact reading (μR/h) × 0.001.
2. Radium Thumb Rule, RSO Magazine, Volume 10, No 4, 2005 = mR/h × 929/8400.

μR/h	Microroentgen per hour
cm	Centimeter
ID	Identification
mCi	Millicurie
mR/h	Milliroentgen per hour
NA	Not available; not calculated
No.	Number
Ra-226	Radium-226
tbsp	Tablespoon
tsp	Teaspoon

FINAL
NAVAL STATION TREASURE ISLAND
REMEDIAL PROJECT MANAGERS AND
BASE REALIGNMENT AND CLOSURE CLEANUP TEAM
MEETING MINUTES
SEPTEMBER 10, 2008

These minutes summarize discussions with the remedial project managers and the Base Realignment and Closure (BRAC) Cleanup Team (BCT) for the former Naval Station Treasure Island (NAVSTA TI). The meeting was held at 10:00 a.m. on September 10, 2008, in the office of Tetra Tech EM Inc. (Tetra Tech) in San Francisco, California. The agenda and sign-in sheet are included as Attachment 1.

The following participants attended the meeting:

Scott Anderson, Department of the Navy, BRAC Program Management Office West, via telephone

Pete Bourgeois, Shaw Group (Shaw)

Tommie Jean Damrel, Tetra Tech

Paisha Jorgensen, San Francisco Bay Regional Water Quality Control Board (Water Board)

Gary Foote, AMEC Geomatrix, for Treasure Island Development Authority (TIDA)

Kevin Hoch, Tetra Tech

Christine Katin, U.S. Environmental Protection Agency (EPA)

Campbell Merrifield, Tetra Tech

Ryan Miya, California Department of Toxic Substances Control (DTSC)

Patrick Owens, Navy Radiological Affairs Support Office (RASO)

Charles Perry, Navy, via telephone

Marcie Rash, Tetra Tech

James Sullivan, Navy

Michael Tymoff, TIDA

James Whitcomb, Navy, via telephone

Thomas Widner, ChemRisk, Inc., for TIDA

I. Introductions, Meeting Guidelines, and Agenda Review

Marcie Rash (Tetra Tech) began the meeting with introductions and a review of the agenda (see Attachment 1). Ms. Rash asked if there were any items to add to the agenda. Scott Anderson (Navy) indicated an update on the Site 24 Treatability Study field efforts would be handed out, but did not need to be included on the agenda. As no additional items were mentioned, Ms. Rash moved on to the first agenda item.

II. Approval of BCT Meeting Minutes

Ms. Rash announced that comments on the June BCT Meeting Minutes had been received from all parties and comments on the July BCT Meeting Minutes had been

received from all parties except EPA. Christine Katin (EPA) indicated she had no comments on the July BCT Meeting Minutes. Ms. Rash said comments on the August BCT Meeting Minutes are due September 24. James Sullivan (Navy) stated the second quarter of final BCT Meeting Minutes (April-June) is scheduled for delivery as well.

Decisions: None.

Action Items: BCT members to provide comments on the August BCT meeting minutes by September 24, 2008.

III. Updates

Navy Funding

Charles Perry (Navy) reviewed the update of Navy funding and project priorities for fiscal year 2008 (see Attachment 2). Mr. Perry discussed the progress of the items listed on the funding update, updating projects that have had scopes of work prepared, proposals requested, and proposals due. There were no questions or comments.

Navy Organization and Other Updates

Mr. Sullivan informed the BCT that Mr. Perry, in addition to his Treasure Island duties, is serving as the interim Lead Remedial Project Manager (LRPM) for the Concord installation for the next 6 months. Mr. Perry indicated he did not anticipate leaving the Treasure Island team, but might need to redistribute some of his current projects among other team members.

Decisions: None.

Action Items: None.

IV. Site 12 Removal Action Update

James Whitcomb (Navy) introduced Pete Bourgeois (Shaw) to provide the status of the field efforts in the Solid Waste Disposal Area (SWDA) removal action.

Mr. Bourgeois distributed his presentation, "Field Efforts in the Solid Waste Disposal Areas" (Attachment 3) and stated excavation work is continuing at SWDA A&B. Removed soil is segregated as Class I, Class II, or low-level radiological soils for disposal, and the Detector Array Rack Towed (DART) scanner is used in 1-foot increments at all excavations. Mr. Bourgeois added that hydroseeding and sod maintenance have been stopped at the request of the TIDA to reduce water usage. Mr. Bourgeois pointed out that no excavations have begun in the backyard of Building 1321 due to the presence of an underground high voltage electrical line.

Mr. Bourgeois presented a new figure (revised from the old figure for clarity) showing where items were discovered, their item number, and the depth at which they were found.

He also noted the additional map symbol "star" on the figure to represent a number of items listed discovered in the soils excavated that were part of the RCRA stockpile (based on lead-in-soil content) or in the soils stockpiled at Site 6. The soil came from between Building 1319 and 1321 at the 0- to 2-foot depth interval, but its exact former location is unknown since it was already stockpiled. Mr. Bourgeois stated nine items identified by the DART scanner had been located before the soil was removed to stockpiles. Ryan Miya (DTSC) pointed out a few locations of commodities on the figure that did not have associated item numbers. Mr. Bourgeois agreed to review the figure and update the information. Mr. Bourgeois indicated the color of the star did not represent the depth at which the items were located.

Mr. Miya asked what the overall total item count was to date. Mr. Bourgeois estimated it was approximately 120 to 130 for all areas, including SWDA A&B. Mr. Miya asked if they were still finding items. Mr. Bourgeois indicated more fragmented pieces continue to be found at the site. Mr. Whitcomb added that the largest number of items that have been found to date corresponded to the area of the bend in the road where the former disposal pit was located, at the end of the former runway. Gary Foote (AMEC Geomatrix) inquired what criterion divided the low- and high-activity levels. Mr. Bourgeois indicated it was 1 millirem on contact as opposed to within 1 foot. Mr. Foote inquired if the low-level radiological soil is sent to Utah. Patrick Owens (Navy RASO) indicated the soil was being sent for disposal to Idaho, and the items themselves were disposed of at Hanford in Washington State by the Army contractor, EMS.

Mr. Bourgeois pointed out that due to delays; the project completion date of November 2008 is unlikely; it is more likely this project will continue into early 2009. Ms. Katin noted that the redevelopment plan does not include housing in what is currently the housing area, and asked whether TIDA was continuing to take new leases and whether new residents were moving in. Mr. Sullivan indicated no additional housing has been leased. Although tenants have moved in and out; no additional buildings have been leased to TIDA. He pointed out that only four leased buildings have been impacted by SWDA removal action activities: Buildings 1211, 1213, 1235, and 1325. Mr. Sullivan estimated there were a total of 904 units on Treasure Island, 700 of which are leased to TIDA, and of those 700, only about 20 leased units are affected by the radiological issues. Michael Tymoff (TIDA) indicated the goal was to continue leasing buildings through the time of redevelopment, and noted the Site 12 area was the last area slated for redevelopment. Mr. Foote noted the Site 12 area is not slated for redevelopment as housing.

Decisions: None.

Action Items: Navy to provide preliminary radiological and chemical data on a figure.

V. TI Radiological Program

Mr. Whitcomb stated that due to the discovery of "loose" alpha particle contamination (defined as contamination that is not fixed to a surface), work at the SWDA A&B has

halted, pending an evaluation of health and safety protocols. Mr. Whitcomb indicated the particles are consistent with the Radium 226 found at the site. He said the team is working with RASO to update the work plans and health and safety plans and will provide an update to the BCT as it becomes available. Mr. Whitcomb indicated although most of the removal action work is complete, there are still issues with soil to be removed in the disposal area at the bend in the road (discussed previously), as well as the removal of the driveway at Building 1321.

Mr. Miya inquired if the "loose" alpha particles are co-located with Radium 226. Mr. Whitcomb indicated the alpha detected in swipe samples is Radium 226. He said it was unclear if there is a different chemistry in the soil or different oxidation-reduction in the soil that is affecting the Radium 226, but no other alpha-emitting isotopes have been observed in the area. Thomas Widner (ChemRisk, Inc.) clarified that the "loose" alpha particles meant an alpha-emitting radiological item. Mr. Owens further explained that the term "loose" is a liberal term indicating contamination without a point source. He said there are two terms used in radiological training, "loose" and "fixed." "Fixed" means attached to an item, whereas "loose" applies to the particles found when collecting swipe samples in an area without a known source. Mr. Owens said RASO was attempting to evaluate and quantify their findings and develop a theory of where the "loose" alpha particles originated; it may turn out that they are associated with the disposal area at the bend in the road. Mr. Whitcomb summarized that the quantity of alpha particles now being detected in SWDA A&B were not observed during removal activities in the two previous SWDAs.

Mr. Miya asked if there are new detections of alpha particles in soils. Mr. Owens clarified that the particles can be located with the DART scanner. Mr. Whitcomb added that the gamma rays are easier to locate as they have a higher energy reading. Mr. Perry pointed out that each time a significant change in site conditions was identified the team would stop, evaluate protocols in conjunction with RASO, and then move forward. Mr. Owens indicated that, when possible, the alpha particles are wrapped and removed once detected.

Mr. Widner inquired whether it was possible the alpha particles were part of the fill used to construct the island. Mr. Owens replied that a background radiological level has been established for Treasure Island, and these readings are exceeding that level. Mr. Widner inquired if it was a naturally occurring radiological source. Mr. Owens indicated that was not likely. Mr. Sullivan added that all of the detections to date were within the work zone.

Mr. Foote inquired if "loose" gamma particles had been detected. Mr. Owens indicated the gamma particles were more indicative of a source, and no, they had not been observed. He stated the term "loose" could be quantified as two to three times the standard deviation of background. Mr. Foote asked if the gamma observed is from a point source or is observed in the soil. Mr. Whitcomb indicated that the gamma observed from Radium 226 decay could be attributed to both the soil and point sources. Mr. Foote asked if the area of "loose" alpha particles has been delineated. Mr. Whitcomb indicated

a figure depicting the detections is being prepared and will be forwarded, along with sample results, when ready. The figure shows that the detections are in isolated areas and not distributed across the whole SWDA A&B.

Mr. Foote asked if this affects only SWDA A&B and if the discovery of the alpha particles was the sole reason for the delay of the project until after the first of the year. Mr. Whitcomb stated both statements are true, the first two SWDAs (1207/1209 and 1231/1233) have been excavated, sampled, and the changes needed in handling the increased level of “loose” alpha are responsible for the delay in the project and new schedules and budgets are being reviewed now.

Mr. Foote inquired if a plan had been developed for excavations in the vicinity of Buildings 1319 and 1321. Mr. Bourgeois indicated a surface scan will be completed and a backyard excavation is planned to 4 feet, and that the Navy is working on a path forward for the triangular area between Buildings 1321 and 1319.

Mr. Widner asked if any progress had been made in identifying what the foils located in SWDA A&B had been used for. Mr. Owens indicated no additional information had been located.

Mr. Foote asked if the sample results for SWDA A&B, requested at the August meeting, were going to be presented. Mr. Whitcomb indicated the information would be forthcoming.

Site 12 Radiological Risk Assessment

Mr. Miya asked if the newly discovered information is being included in the radiological risk assessment. Mr. Perry indicated the current plan is to produce the draft final radiological risk assessment in October, focusing on the occupied/formerly occupied buildings only (1211, 1213, 1235, 1237, and 1325). The remedial investigation (RI) report for Site 12 will incorporate all findings. He reported the goal of the current risk assessment is to determine how appropriate it is for the units to be occupied. Mr. Foote inquired if that applied only to unoccupied buildings. Mr. Perry indicated it was focused on specific buildings that are occupied or previously occupied. Mr. Miya inquired if the fact that some buildings were outside the SWDA areas was the reason they were excluded from the risk assessment. Mr. Perry indicated that surface scans of the buffer areas surrounding the SWDAs have been completed and did not identify any areas of concern. Mr. Foote asked why the risk assessment would not apply to any previously unoccupied buildings. Mr. Perry indicated the primary concern at this time was the occupied buildings, and the remaining buildings will be addressed in the Site 12 RI Report. Mr. Foote asked if the Navy anticipated that the buildings would not be available for lease until the RI was completed. Mr. Sullivan confirmed the Navy did not intend to lease any additional buildings until the RI was complete, but would be agreeable to have further discussions with TIDA on that subject.

Mr. Whitcomb pointed out the Site 12 Radiological Risk Assessment has been added to the document tracking sheet. It could possibly be discussed at the October BCT meeting,

and it is anticipated to be final as early as December. Mr. Miya clarified the risk assessment is focusing on only the specific current and formerly occupied buildings. Mr. Whitcomb agreed that was true.

Mr. Whitcomb indicated a Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) 2 and 3 survey, for the SWDAs, was being prepared with RASO, and a revised work plan could be ready for the BCT to review as early as December. The actual work could be completed in late 2009. Mr. Foote inquired if the additional scans surrounding the previously occupied buildings were part of the MARSSIM survey. Mr. Whitcomb indicated they would be considered, but there were many parts involved. Mr. Owens clarified there are many steps to a MARSSIM survey and collection of detailed data is important.

Mr. Foote inquired if the MARSSIM 2 and 3 survey would expand into the area surrounding the occupied buildings. Mr. Owens indicated the survey would approach the other buildings not already scanned. Mr. Sullivan said the implication was that there would be no new occupants in formerly occupied buildings until after the MARSSIM survey had been completed, and the Navy wanted to assess what risk, if any, existed at the formerly occupied buildings. Until the MARSSIM survey is completed, along with the other activities in the SWDAs, these buildings are not appropriate to reoccupy. Mr. Foote said that that was important information; he clarified that previously it had been anticipated the buildings could be reoccupied upon completion of the current risk assessment, and now that has been delayed until late 2009. Mr. Owens indicated the schedules would depend on scoping the work, budgets, and BCT approval. Mr. Foote indicated it was important do to the work correctly and thoroughly but TIDA would appreciate if it could be done quickly as well.

Buildings 233, 343, and 344

Mr. Whitcomb indicated responses to the additional California Department of Public Health (CDPH) comments on the Buildings 343 and 344 survey reports are being prepared. Mr. Whitcomb indicated the demolition of Building 233 has been awarded to Shaw. Shaw has started preliminary work at the building including DART scanning of the asphalt parking area. Residual contamination was identified in the building in several areas (floor boards, concrete floors in the bathrooms, and low levels in some wallboard) and slightly elevated readings were observed in the asphalt just outside the doors to the parking lot. Mr. Foote asked whether Building 233 and its parking lot had been secured from public access. Mr. Whitcomb indicated that the preliminary DART surveys and instrument readings indicate the area is not a health hazard. Mr. Sullivan added that Building 233 is secured; and a fence surrounds a portion of the site as a result of the fire at Building 7. Mr. Owens said that because the readings are low enough and the asphalt layer provides enough of a barrier, it is not considered an immediate threat to the public. Mr. Miya inquired if it is considered surficial contamination. Mr. Owens clarified based on the initial surveys and DART scans confirm the contamination was beneath the asphalt, not in an open area. He continued saying past Navy practices were to typically pave over areas with this type of issue. Mr. Whitcomb indicated the results from the

DART scanning were from a contained area of concern, likely due to the exiting of the building after the 1950s spill. Mr. Owens said the readings were not high enough to calculate a dose. Mr. Sullivan stated that the desired end result is to obtain radiological closure of the building site, similar to Buildings 343 and 344.

Decisions: None.

Action Items: None.

VI. Upcoming Documents and Field Activities

Upcoming Documents

Ms. Rash (Tetra Tech) reviewed the document tracking sheet (DTS) (see Attachment 4) and pointed out the documents scheduled to be distributed to the BCT in the next 30 days, as well as documents for which regulatory agency review comments are due in the next 30 days or are overdue. Ms. Rash also said that highlighting had been added to the document to indicate the response to comments (RTC) phases to aid reviewers.

Mr. Foote asked about the status of the RTCs for the Arsenic in Groundwater Pilot Study and if the document would proceed to the final version without discussing the RTCs. Mr. Bourgeois indicated Shaw and the Navy are working on RTCs, and Mr. Anderson indicated the BCT would be able to review the RTCs before a final work plan was prepared.

Mr. Miya asked if the draft documents had been prioritized based on the large number scheduled to be delivered in September. Mr. Perry indicated the Site 12 Soil Gas Sampling and Analysis Plan would be first priority, then the Site 33 RI Report as second priority, followed by the RTCs on the Sites 8, 28, and 29 RI Reports.

Field Schedule

Ms. Rash reviewed the field activities scheduled to begin in the next 30 days (see Attachment 5). Mr. Miya noted the start date for the Site 21 Treatability Study had been updated to reflect the delay due to the Oracle event, and asked if the revised date was a mobilization date or the start of the treatment. Mr. Anderson indicated it would be the mobilization date.

Action Items: None.

VII. RAB Meeting

Mr. Sullivan outlined a proposed agenda for the October 21 Restoration Advisory Board (RAB) Meeting. He indicated this could be updated at the October BCT meeting as well. The proposed agenda included the following topics:

- Site 12 Removal Action Update
- Sites 21 and 24 Treatability Studies
- Sites 30 and 31 Proposed Plan Comment Period
- Site 33 Draft RI Report
- PCB Field Activity Report

Mr. Sullivan asked if there were other suggestions. He stated he would work with the RAB representatives to prepare the draft agenda.

Decisions: None.

Action Items: None**.**

VIII. Community Relations Update

Community Relations Activities Update

Tommie Jean Damrel (Tetra Tech) reviewed the Community Relations Activities/Items Update (see Attachment 6). She indicated the work notices for the Site 12 Soil Gas Investigation and the Arsenic Pilot Study that were planned in the vicinity of residences had been added to the update, and stated the notices would be forwarded to the BCT for review one week before the field effort began. Mr. Miya suggested adding to the field work notices a description of what residents might see, such as dump trucks, backhoes, etc., in the hope that by providing more information, there would be fewer calls from residents seeking clarification.

Ms. Damrel said the tentative dates for the public comment period for the Site 30 and 31 proposed plans were September 23 through October 23. She anticipates mailing the plans on September 17th. Ms. Damrel stated October 7th or October 8th have been proposed for the public meeting date. The BCT preferred October 7th. Mr. Sullivan said he would check on the availability of the Casa De La Vista as a meeting location. Mr. Miya suggested including the Kidango daycare center users in the mailing. Ms. Damrel noted that a public notice of the plans and meeting would be published in the *San Francisco Chronicle*. Mr. Sullivan indicated the proposed plans would be mailed to each housing unit on the island, as well as the over 200 other individuals and organizations who have signed up to be on the mailing list. He said that individual housing residents are also added by name if they sign up at Navy public events.

Ms. Damrel asked for clarification about the two radiological program fact sheets, and whether two separate fact sheets were required. Mr. Sullivan indicated one had been focused on the completion of the SWDA removal actions, and the second was focused on the basewide radiological program; however, since the completion of the SWDA removal action had been delayed, perhaps a more reasonable milestone should be selected. Mr. Foote suggested the completion of the radiological risk assessments as a potential milestone for distribution of a fact sheet. Mr. Whitcomb said a schedule and path

forward for the MARSSIM survey should be available soon. Mr. Sullivan indicated January 2009 would be a more acceptable time for a fact sheet to be published due to the holidays.

Ms. Damrel pointed out the next version of the newsletter was due late January 2009, and said she hoped to profile Mr. Miya as the new DTSC BCT representative.

Ms. Damrel also provided an overview of the August RAB meeting, during which one resident had asked a series of questions relating to the SWDA removal actions. Mr. Foote asked if there had been any other inquiries from the public. Mr. Sullivan indicated he had received an email from a boardsailor and he had responded with a Site 12 schedule status update.

Decisions: None.

Action Items: Work notices for Site 12 Soil Gas Investigation and Arsenic Treatability Study will be added to the Community Relations Update.

Mr. Sullivan will confirm availability of the Casa de la Vista for the Site 30 and 31 public meetings.

IX. Future BCT Agenda Items/Other Meetings

Ms. Rash asked for input on items for next month's meeting agenda.

Mr. Foote asked if the RTCs on the Draft Building 233 Scoping Survey Report would be available and whether it would be beneficial to discuss the responses at the next BCT meeting, as TIDA had extensive comments about the parking lot. Mr. Owens indicated the work plan for Building 233 was prepared to address only the building structure and not the parking lot, but that while conducting the field survey, the parking lot was identified as an area of concern when equipment detected elevated readings. Mr. Whitcomb has prepared a scope of work to address the possible radiological contamination in the parking lot; he indicated the project would be awarded shortly. Mr. Miya asked if a new work plan would be forthcoming; Mr. Whitcomb said he would discuss it next month. Mr. Foote indicated an action time to discuss the path forward would be appreciated. He requested some assurance that the issue will be addressed and that the area is secured and not accessible at this time until the investigation is complete.

X. Discuss Other Items/Review Action Items

Other Items

Mr. Anderson asked Mr. Bourgeois to hand out a presentation providing an update on the field work at Site 24 (See Attachment 7). Mr. Anderson indicated the next steps include (1) an evaluation of analytical data collected, and (2) preparation of potential

recommendations for any additional injection or extraction wells or for reconfiguration of the system, to be presented to the BCT at a future date.

Action Item Review

The team reviewed the action items list (see Attachment 8), and all action items are complete. No new action items had been generated from the meeting discussions.

Decisions: None.

Action Items: None.

Future BCT Meetings

- October 8, 2008, Tetra Tech, San Francisco, California
- November 5, 2008, Tetra Tech, San Francisco, California
- December 3, 2008, Tetra Tech, San Francisco, California.

Mr. Sullivan noted Tetra Tech's San Francisco office will be moving to Oakland in December; therefore, TI BCT meetings will likely take place at their Oakland office location starting in January 2009.

The meeting was adjourned.

ATTACHMENT 1

AGENDA AND SIGN-IN SHEET

(3 Pages)

AGENDA
NAVAL STATION TREASURE ISLAND
BRAC CLEANUP TEAM / REMEDIAL PROJECT MANAGERS MEETING

Date: **Wednesday September 10, 2008**
Time: 10:00 a.m. to 12:00 p.m.
Place: Tetra Tech EMI – San Francisco, 18th Floor, 135 Main Street, San Francisco, CA
Dial In: Dial In: 866-270-2016
Meeting ID#: 2008

10:00-10:05 Item: **I.** **Introductions, Meeting Guidelines and Agenda Review**
Opening: Facilitator
Goal: Introduce all attendees, discuss changes to agenda or add 'Other Items'

10:05 – 10:10 Item: **II.** **Approval of BCT Meeting Minutes**
Opening: James Sullivan
Goal: Address BCT review comments on previous meeting minutes and approve
Process:
- BCT Discussion/question and answer
- LRA Check-in/question and answer
- Update and identify action items

10:10 – 10:20 Item: **III.** **Navy Update**
Opening: Charles Perry/James Sullivan
Goal: Provide updates on budget, changes within the Navy organization, etc.
Process:
- BCT Discussion/question and answer
- LRA Check-in/question and answer
- Update and identify action items

10:15 – 11:00 Item: **IV.** **Site 12 Removal Action Update**
Opening: Jim Whitcomb
Goal: Provide an update on Site 12 SWDA removal action and data
Process:
- BCT Discussion/question and answer
- LRA Check-in/question and answer
- Update and identify action items

11:00 – 11:20 Item: **V.** **TI Radiological Program**
Opening: Jim Whitcomb
Goal: Provide an update on status of the radiological program basewide (Buildings 233, 343 and 344, and the Radiological Risk Assessment of Selected Site 12 SWDA Buildings)
Process:
- BCT Discussion/question and answer
- LRA Check-in/question and answer
- Update and identify action items

11:20 – 11:30 | Item: **VI.** | **Upcoming Documents and Field Activities**
Opening: Kevin Hoch
Goal: Identify upcoming documents and field activities
Process: Distribute document tracking sheet and field schedule and discuss items upcoming in the next month

- BCT Discussion/question and answer
- LRA Check-in/question and answer
- Update and identify action items

11:30– 11:40 | Item: **VII.** | **RAB Meeting Agenda/Community Relations Update**
Opening: James Sullivan
Goal: Review draft agenda for the August 19th RAB meeting, public meetings, and any related topics.
Process:

- BCT Discussion/question and answer
- LRA Check-in/question and answer
- Update and identify action items

11:40 – 11:50 | Item: **VIII.** | **Future BCT Agenda Items/Other Meetings**
Opening: James Sullivan
Goal: Agree on agenda items for the next RPM/BCT meetings and review scheduled upcoming meetings
Process:

- ✓ Review scheduled upcoming meetings
- ✓ BCT to identify future agenda items

- BCT to identify other items for discussion
- BCT Discussion/question and answer
- LRA Check-in/question and answer
- Update and identify action items

11:50 – 12:00 | Item: **IX.** | **Discuss Other Items/Review Action Items**
Opening: BCT Members
Goal: Discuss other items and review action items
Process:

- ✓ Identify other items
- ✓ Review Action Items

- BCT to identify other items for discussion
- BCT Discussion/question and answer
- LRA Check-in/question and answer
- Update and identify action items

Future RPM/BCT Meetings:

October 8, 2008 Tetra Tech EMI, San Francisco, California
November 5, 2008 Tetra Tech EMI, San Francisco, California
December 3, 2008 Tetra Tech EMI, San Francisco, California

Sign-In Sheet

Treasure Island BCT Meeting	Date: September 10, 2008	Time: 10:00 AM PST	Location: 135 Main Street (San Francisco)

Sign In	Name	Organization	Phone	Email (Optional)
by phone	Scott Anderson	Navy	(619) 532-0938	scott.d.anderson@navy.mil
	Pete Bourgeois	Shaw	(415) 277-6983	Peter.bourgeois@shawgrp.com
	Tommie Jean Damrel	Tetra Tech	(415) 222-8232	tommiejean.damrel@ttemi.com
	Gary Foote	AMEC Geomatrix	(510) 663-4260	Gfoote@geomatrix.com
	Kevin Hoch	Tetra Tech	(415) 222-8304	Kevin.hoch@ttemi.com
	Paisha Jorgensen	Water Board	(510) 622-2756	PJorgensen@waterboards.ca.gov
	Christine Katin	US EPA	(415) 972-3112	Katin.Christine@epa.gov
	Campbell Merrifield	Tetra Tech	(415) 222-8206	Campbell.merrifield@ttemi.com
	Ryan Miya	DTSC	(510) 540-3775	RMiya@dtsc.ca.gov
by phone	Charles Perry	Navy	(619) 532-0911	charles.l.perry@navy.mil
	Marcie Rash	Tetra Tech	(415) 222-8279	marcie.rash@ttemi.com
	Charles Smith	Caltrans	(510) 286-5635	charles_smith@dot.ca.gov
	James Sullivan	Navy	(619) 532-0966	james.b.sullivan2@navy.mil
	Michael Tymoff	TIDA	(415) 554-7038	Michael.tymoff@sfgov.org
by phone	James Whitcomb	Navy	(619) 532-0936	james.h.whitcomb@navy.mil
	Patrick Owens	Navy	757887-4692	Patrick.A.Owens@navy.mil
	THOMAS WIDNER	ChemRisk, Inc.	415-618-3207	twidner@chemrisk.com

AGENDA
NAVAL STATION TREASURE ISLAND
BRAC CLEANUP TEAM / REMEDIAL PROJECT MANAGERS MEETING

Date: **Wednesday, January 4, 2011**
Time: 10:00 a.m. to 12:00 p.m.
Place: Tetra Tech EMI, 1999 Harrison Street, Suite 500, Oakland, CA
Dial In: 800-857-4419
Meeting ID#: 2012000

10:00 – 10:05 Item: **I.** **Introductions, Meeting Guidelines, Agenda Review**
Opening: Facilitator
Goal: Introduce all attendees, review guidelines, discuss changes to agenda or add 'Other Items'

10:05 – 10:10 Item: **II.** **Approval of BCT Meeting Minutes**
Opening: James Sullivan
Goal: Address BCT review comments on previous meeting minutes and approve
Process:
- BCT discussion/question and answer
- LRA check-in/question and answer
- Update and identify action items

10:10 – 10:20 Item: **III.** **Navy and Organizational Updates**
Opening: Dave Clark / James Sullivan
Goal: Provide updates on Navy budget, changes within the Navy organization, and other BCT organizational updates
Process:
- BCT discussion/question and answer
- LRA check-in/question and answer
- Update and identify action items

10:20 – 10:35 Item: **IV.** **Transfer Update**
Opening: James Sullivan
Goal: Provide summary status of Navy/TIDA transfer discussions and information on transfer related environmental tasks
Process:
- Discuss schedules for closing condition sites
- BCT discussion/question and answer
- LRA check-in/question and answer
- Update and identify action items

10:35 – 11:05 Item: **V.** **Field Activities**
Opening: Brian Holmgren
Goal: Provide an update on field activities (Building 233, Sites 12, 21, 24, 32, and 31/33).
Process:
- BCT discussion/question and answer
- LRA check-in/question and answer
- Update and identify action items

11:05 – 11:20 Item: **VI.** **Upcoming Documents and Field Activities**
Opening: Dave Clark / Jessica Beck
Goal: Identify upcoming documents and field activities
Process:

- ✓ Distribute document tracking sheet and field schedule and discuss items upcoming in the next month

- BCT discussion/question and answer
- LRA check-in/question and answer
- Update and identify action items

11:20 – 11:35 Item: **VII.** **RAB Meeting Agenda / Community Relations Update**
Opening: James Sullivan / Tommie Jean Valmassy
Goal: Discuss outcome of previous RAB meeting, the draft agenda for the upcoming RAB meeting, and provide comrel updates
Process:

- ✓ Discuss any inquiries received from community members

- BCT discussion/question and answer
- LRA check-in/question and answer
- Update and identify action items

11:35 – 11:50 Item: **VIII.** **Discuss Other Items**
Opening: BCT Members
Goal: Discuss other items
Process:

- ✓ Identify other items

- BCT to identify other items for discussion
- BCT discussion/question and answer
- LRA check-in/question and answer
- Update and identify action items

11:50 – 12:00 Item: **IX.** **Action Item Review / Other Meetings / Future BCT Agenda Items**
Opening: James Sullivan
Goal: Review action items, agree on agenda items for the next RPM/BCT meeting, and review scheduled upcoming meetings
Process:

- ✓ Review action items
- ✓ Review scheduled upcoming meetings
- ✓ BCT to identify future agenda items

- BCT to identify other items for discussion
- BCT discussion/question and answer
- LRA check-in/question and answer
- Update and identify action items

Future BCT / RPM Meetings:

February 1, 2012, Tetra Tech EMI Inc., Oakland, California
March 7, 2012, Tetra Tech EMI Inc., Oakland, California
April 4, 2012, Tetra Tech EMI Inc., Oakland, California

12:30 – 4:00 ***POST-BCT MEETING***

Sites 31/33 Work Plan Technical Meeting

Dial In: 800-857-4419
Meeting ID#: 4880484

AGENDA
NAVAL STATION TREASURE ISLAND
BRAC CLEANUP TEAM MEETING

Date: **Wednesday, February 21, 2018**
Time: 10:00 a.m. to 12:00 p.m.
Place: Tetra Tech, 1999 Harrison Street, Suite 500, Oakland, CA
Dial In: 800-523-8437
Meeting ID#: 715 4872 172
Webinar link: https://global.gotomeeting.com/join/400720045

10:00 – 10:10 (10 minutes)	**Introductions, Meeting Guidelines, Agenda Review, Meeting Minutes** (Dave Clark)
10:10 – 10:25 (15 minutes)	**Site 24 Update** (Mukesh Mehta)
10:25 – 10:35 (10 minutes)	**Site YF3 Update** (Mukesh Mehta)
10:35 – 10:45 (10 minutes)	**Site 12 Field Work Update** (Chris Yantos / Leo Larson)
10:45 – 10:55 (10 minutes)	**Caltrans YBI Site Discussion** (Dave Clark)
10:55 – 11:05 (10 minutes)	**General Discussion of Radiological Issues at TI** (Dave Clark)
11:05 – 11:20 (15 minutes)	**Property Transfer Update** (Dave Clark)
11:20 – 11:30 (10 minutes)	**Upcoming Documents and Field Activities** (Dave Clark)
11:30 – 11:40 (10 minutes)	**Open Forum for City / Developer / BCT**
11:40 – 11:50 (10 minutes)	**Community Relations Update** (Dave Clark / Tommie Jean Valmassy)
11:50 – 12:00 (10 minutes)	**Action Item Review / Other Meetings** (Dave Clark / Katie Henry)

Future BCT Meetings:

March 21, 2018, Tetra Tech Inc., Oakland, California
April 18, 2018, Tetra Tech Inc., San Diego, California [note alternate location]
No Meeting in May

AGENDA
NAVAL STATION TREASURE ISLAND
BRAC CLEANUP TEAM MEETING

Date: **Wednesday, March 21, 2018**
Time: 10:00 a.m. to 11:30 a.m.
Place: Tetra Tech, 1999 Harrison Street, Suite 500, Oakland, CA
Dial In: 800-523-8437
Meeting ID#: 715 4872 172
Webinar link: https://global.gotomeeting.com/join/400720045

10:00 – 10:10 (10 minutes)	**Introductions, Meeting Guidelines, Agenda Review, Meeting Minutes** (Dave Clark)
10:10 – 10:25 (15 minutes)	**Site 12 Field Work Update** (Chris Yantos / Leo Larson)
10:25 – 10:35 (10 minutes)	**General Radiological Update** (Dave Clark)
10:35 – 10:50 (15 minutes)	**Property Transfer Update** (Dave Clark)
10:50 – 11:00 (10 minutes)	**Upcoming Documents and Field Activities** (Dave Clark)
11:00 – 11:10 (10 minutes)	**Open Forum for City / Developer / BCT**
11:10 – 11:20 (10 minutes)	**Community Relations Update** (Dave Clark / Tommie Jean Valmassy)
11:20 – 11:30 (10 minutes)	**Action Item Review / Other Meetings** (Dave Clark / Katie Henry)

Future BCT Meetings:

April 18, 2018, Tetra Tech Inc., San Diego, California [note alternate location]
No Meeting in May
June 20, 2018, Tetra Tech Inc., Oakland, California